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National Water Quality Inventory
1982 Report to Congress

(U.S.) Environmental Protection Agency
Washington, DC

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National Water Quality Inventory

1982 Report to Congress

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This report was prepared pursuant to Section 305(b) of the Clean Water Act, which states:

"(b)(1) Each State shall prepare and submit to the Administrator by April 1, 1975, and shall bring up to date by April 1, 1976, and biennially thereafter, a report which shall include—

"(A) a description of the water quality of all navigable waters in such State during the preceding year, with appropriate supplemental descriptions as shall be required to take into account seasonal, tidal, and other variations, correlated with the quality of water required by the objective of this Act (as identified by the Administrator pursuant to criteria published under section 304(a) of this Act) and the water quality described in subparagraph (B) of this paragraph;

"(B) an analysis of the extent to which all navigable waters of such State provide for the protection and propagation of a balanced population of shellfish, fish, and wildlife, and allow recreational activities in and on the water;

"(C) an analysis of the extent to which the elimination of the discharge of pollutants and a level of water quality which provides for the protection and propagation of a balanced population of shellfish, fish, and wildlife and allows recreational activities in and on the water, have been or will be achieved by the requirements of this Act, together with recommendations as to additional action necessary to achieve such objectives and for what waters such additional action is necessary;

"(D) an estimate of (i) the environmental impact, (ii) the economic and social costs necessary to achieve the objective of this Act in such State, (iii) the economic and social benefits of such achievement; and (iv) an estimate of the date of such achievement; and

"(E) a description of the nature and extent of nonpoint sources of pollutants, and recommendations as to the programs which must be undertaken to control each category of such sources, including an estimate of the costs of implementing such programs.

"(2) The Administrator shall transmit such State reports, together with an analysis thereof, to Congress on or before October 1, 1975, and October 1, 1976, and biennially thereafter."

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United States
Environmental Protection
Agency

Washington DC
20460

EPA

The Administrator

Dear Mr. President:
Dear Mr. Speaker:

As required by Section 305(b) of the Clean Water Act of 1972 (P.L. 92-500) and its 1977 amendments, I am transmitting to the Congress the National Water Quality Inventory Report for 1982. This report is the third in the series of national inventory reports published since 1976. It is based primarily on reports submitted by the States in 1982, with additional information from 1980 reports wherever gaps exist in the 1982 submissions. The 1980 and 1982 State reports are being transmitted to the Congress in their entirety.

The 1982 State Section 305(b) reports reveal that water quality is improving in many States. In fact, the majority of the Nation's waters assessed in 1982 meet the interim Clean Water Act goal. Many water quality improvements can be directly attributed to pollution control programs. For example, 36 States cite specific improvements resulting from the construction of municipal wastewater treatment facilities, and 20 States report improved water quality due at least in part to pollution controls implemented by industry. A number of successes in nonpoint source pollution abatement are also reported, although the effects of nonpoint controls tend to be difficult to quantify.

Despite this progress, point and nonpoint sources of pollution, as well as other factors such as natural variation in stream flow and hydrologic modifications, continue to cause violations of water quality standards and are limiting water uses in many areas of the country. Two issues of national concern are pollution resulting from toxic substances, and ground-water contamination and depletion. Thirty States cite violations of water standards or impairments of water uses due to toxic substances. Ground-water problems due to contamination or depletion are reported in over half the States.

These results demonstrate that the basic structure of the Clean Water Act is sound. That is, the dual emphasis on technology-based controls—uniform national requirements for point sources—and on water quality-based controls, which are imposed only where technology-based controls are inadequate, has resulted in dramatic progress. EPA's current programs to implement the Clean Water Act focus on two key objectives:

- Continue to develop and implement technology-based controls. EPA is actively developing the national regulations to control the industrial discharge of toxic pollutants, and with the States will move rapidly to clear the backlog of permits which must be issued to implement these controls.
- Strengthen the water quality-based approach so it will be available where needed to control point sources of pollution in the areas where technology-based controls are not sufficient to achieve water quality standards.

EPA is also beginning to focus greater attention on nonpoint sources of pollution. A national nonpoint source implementation policy is being developed, and various State and local efforts are already underway which should increase our understanding of the causes and effects of nonpoint source pollution.

The primary sources of information for this report are the water quality monitoring programs operated by the States. Many of these programs are currently undergoing a transition from traditional chemical water quality analyses to a more comprehensive combination of biological, physical, and chemical analyses. Therefore, the conclusions expressed in this report, which still rely heavily on traditional measures of water pollution, may change in future reports as better information is generated through expanded monitoring efforts. EPA will continue to work with the States in developing and improving future reports in this series.

Sincerely yours,

William D. Ruckelshaus

Honorable George Bush
President of the Senate
Washington, D.C. 20510

Honorable Thomas P. O'Neill, Jr.
Speaker of the House of Representatives
Washington, D.C. 20515

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Preface

This document, the third in a series of National Water Quality Inventory reports published since 1976, is based on water quality reports to the Congress submitted by the States and other jurisdictions of the United States in 1982. In some cases, State-reported information is supplemented by Environmental Protection Agency (EPA) data, particularly where national program issues are discussed. Because no National Water Quality Inventory report was published in 1980, information from the 1980 State reports is included in this document where 1982 data are lacking.

The State water quality reports, which provide descriptions of the water quality of all navigable waters in the individual States, are prepared biennially pursuant to Section 305(b) of the Clean Water Act. In 1982, 55 of a total of 58 States and jurisdictions submitted reports. The submissions from the States and jurisdictions are being transmitted to the Congress in their entirety with this report. A summary of each State's submission is included in Appendix B.

Section 305(b) of the Clean Water Act requires each State to submit a biennial report to the EPA describing the quality of its navigable waters. This report is to include the following: an analysis of the extent to which the State's waters provide for healthy fish, shellfish, and wildlife populations and allow water-based recreation; an analysis of the extent to which pollution control actions have achieved this level of water quality, and recommendations for needed additional actions; an estimate of the environmental impacts, economic and social costs and benefits, and date of achieving this level of water quality; and a description of the nature and extent of nonpoint sources of pollution and recommendations for their control. The EPA is required to transmit the State reports to Congress, along with a summary of these reports describing the quality of the Nation's waters.

The State Section 305(b) reports tend to focus primarily on the quality of inland waters and, in particular, on rivers and streams. Some States discuss lake quality and ground water, and some coastal States emphasize water quality issues in selected bays or estuaries. Because such coverage is incomplete in other States, however, this report does not attempt to analyze coastal areas, wetlands, ground water, and lake quality at length.

1 Introduction and Overview

Background of the 1972 Clean Water Act

The Federal Water Pollution Control Act Amendments of 1972 (the Clean Water Act) were passed at a time when serious water quality problems existed in many parts of the country. For example:

- In the 1960s, Ohio's Cuyahoga River and New York's Buffalo River were so oil-slicked and polluted they actually caught on fire. The Houston Ship Channel, the Calumet River, and many other waterways were plagued by poorly treated or untreated municipal and industrial wastes.
- In 1968, over 44 million people were served by municipal wastewater treatment facilities which provided only primary levels of treatment.* Sewage from over ten million people received no treatment and was discharged directly into the Nation's waters.
- Many States had only limited controls on industrial discharges, and no uniform, national approach existed to regulate the quality of industrial discharges.
- Our knowledge of a number of possibly significant problems, such as the prevalence of toxic substances in the Nation's waterways and the contribution of nonpoint sources of pollution to water degradation, was very limited.

The Congress passed the Clean Water Act in 1972 to deal with these problems. The Act establishes two types of regulatory requirements: technology-based guidelines, which set uniform national requirements for discharges by industries and sewage treatment facilities; and water quality-based standards adopted by the States.

The EPA is required to establish uniform national technology-based requirements which apply to municipal and industrial point sources of pollution. For municipalities, the technology-based standard is commonly referred to as secondary treatment. For industrial discharges, technology-based requirements are referred to as best practicable treatment (BPT), best conventional technology (BCT), and best available technology (BAT). The primary bases for adoption of these requirements are available or demonstrated treatment technologies and costs. These technology requirements are embodied in federal regulations and are incorporated into National Pollutant Discharge Elimination System (NPDES) permits issued in accordance with Title IV of the Clean Water Act.

Technology-based guidelines set uniform national requirements for a specific industrial category. These requirements vary from industry to industry. For example, the steel industry is regulated differently than the textile industry because of the differences in waste generated by each, and the technologies which are available to control these wastes. Moreover, different requirements exist even within an industrial category. The steel industry, for example, has 52 subcategories, each of which have somewhat different requirements. Different types of municipal sewage treatment systems, such as lagoons and activated sludge treatment plants, also have different technology requirements.

Every municipal and industrial point source discharger is required to meet these minimum technology-based requirements with a few limited exceptions. Permits are issued to the owners or operators of municipal or industrial facilities which specify discharge limits in terms of a maximum concentration, mass loadings, or both. Discharge of pollutants from a municipal or industrial facility without a permit or in violation of any of the conditions of a permit (including failure to monitor the discharge and report such monitoring data to the State or EPA) is a violation of the Clean Water Act.

Water quality standards are the second regulatory requirement established by the Act. These standards have a different focus than the technology-based requirement. Under Section 303 of the Act, States are required to adopt water quality standards as State rules or laws. Water quality standards define the uses to be made of water (such as public water supply, propagation of fish and wildlife, recreation, agricultural and industrial purposes, and navigation) and the criteria to protect the uses. Criteria are acceptable qualitative or quantitative estimates of water constituents which should ensure that the use is attained.

Currently, all States and jurisdictions have approved water quality standards. For most waters, these standards include a fish and wildlife protection use, commonly referred to as a "fishable" use. Only eight States have some waterbodies which are not assigned "fishable" uses. All State standards include criteria for "traditional" constituents such as temperature, pH, dissolved oxygen, fecal coliform bacteria, and the "free froms." "Free froms" are general narrative criteria statements directed at controlling aesthetic qualities such as taste, odor, color, and other elements including settleable solids, oil, and toxics.

Water quality standards serve three important functions under the Clean Water Act. First, they establish a goal for a particular stream or waterbody. This goal is expressed as a use which is to be attained or protected and a level of water quality which is to be achieved. Second, water quality standards, through the water quality management process, assist the States in making management decisions for setting priorities, developing and implementing programs to control nonpoint (diffuse) sources of pollution, and evaluating the progress of water pollution control programs. Finally, and most importantly, water quality standards serve as a regulatory tool. National technology-based standards are applied regardless of the type of waterbody or the quality of the water receiving the discharge; therefore, the pollution reduction resulting from those requirements for a particular stream may be inadequate to protect designated uses in State water quality standards. For such cases, permits written on the basis of water quality standards provide the additional level of protection needed to protect or restore the designated use.

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*See glossary for definition of terms.

To implement these two regulatory requirements, the Act also establishes several processes including a discharge permitting program, a program of grants for the construction of sewage treatment facilities, and a basic approach encouraging best management practices for the control of nonpoint source pollution.

Summary of Progress to Date

The data provided by the 1982 State Section 305(b) reports, together with other EPA information, show what changes have occurred in water quality and in abatement and control programs since 1972. This information indicates that the basic approach to pollution control envisioned in the Clean Water Act is working.

Pollutant reductions have occurred. Substantial reductions have occurred in the amounts of pollutants that would otherwise have entered the Nation's waters:

- Implementation of BPT regulations is estimated to have reduced industrial discharges of six key pollutants substantially from 1972 to 1977: biochemical oxygen demand (BOD) by 71 percent; suspended solids by 80 percent; oil and grease by 71 percent; dissolved solids by 52 percent; phosphate by 74 percent; and heavy metals by 78 percent.

- Sewage treatment plants are removing about 13,600 tons per day of the two principal conventional pollutants, BOD and suspended solids. This is an increase of 65 percent over 1973 levels. The reason for the increased pollutant removals is that with the help of construction grants, increasing numbers of major municipal treatment plants are achieving secondary treatment levels. In July 1977, 37 percent of the secondary plants required by the Clean Water Act had been constructed; by June 1983, that number had risen to 69 percent.

- The increased treatment levels in municipal wastewater treatment plants (WWTPs) have offset the increase in pollutant loads that has occurred because of increasing population, new sewers, and population shifts. In other words, the total amount of pollutants entering the Nation's waters from WWTPs has stayed roughly constant in the last decade, even though the population served increased by 18 million and municipal wastewater flow increased by almost 7 billion gallons per day.

Compliance rates are improving. Achieving municipal and industrial compliance with permit limits is a central goal of the Clean Water Act and a crucial reason for its success. EPA data show that the percentage of major municipal treatment plants in significant non-compliance with their permits decreased from 27 percent in 1981 to 22 percent by December 1982. Significant progress has been made in the reissuance of operating permits for municipal plants, although backlogs continue, in particular for minor plants. The percentage of major industrial plants in significant non-compliance decreased from 18 percent in 1981 to 15 percent by December 1982. Progress has been made in the reissuance of industrial permits, although the current backlog of permits which must be reissued is expected to grow as previously-issued permits expire. Again, minor dischargers form the bulk of the backlog.

Nonpoint source controls are being applied. Progress has also been made in the application of nonpoint source controls. Forty-seven States have approved agricultural nonpoint source programs and 39 States are taking implementation actions. Sixteen States are implementing regulatory sediment and erosion control programs to control the runoff of pollutants from construction activities. Thirty-seven States have silvicultural nonpoint source control programs, varying in nature from regulatory (including forest practice acts) to nonregulatory (for example, education and technical assistance).

Progress is being made in controlling toxic pollutants. EPA studies and sampling efforts show that current BPT discharge limits and existing BPT permits are removing significant amounts of a number of toxic organic chemicals and heavy metals from industrial discharges. Furthermore, a survey of wastewaters entering and leaving municipal sewage treatment facilities reveals that well-operated plants meeting secondary treatment requirements provide incidental removal of priority pollutants such as heavy metals and organics. Nevertheless, as will be discussed below, toxic pollutants continue to cause water quality problems in many areas.

Overall water quality is improving. The State Section 305(b) reports indicate that the Nation's water quality is beginning to show improvements as a result of the above actions. One of the primary measures of water quality status is the States' estimate of progress toward the interim goal of the Clean Water Act: that, wherever attainable, water of fishable and swimmable quality be achieved by 1983. In 1982, a majority of the State waters which were assessed met this interim goal. (For State-by-State details, see Table 1, Chapter 3.)

Trend information from the 1982 State Section 305(b) reports reveals that progress has been made in the control of water pollution in many States. Twenty-one of the 35 States reporting overall trend information cite generally improving water quality trends. Fourteen States report generally stable trends; none report Statewide degrading trends. However, 29 States report some degrading trends in localized areas.

Control programs are producing results. The States provide many examples of water quality improvements that can be attributed directly to point and nonpoint source control programs. For example, thirty-six States cite improvements in their waters as a direct result of the construction of wastewater treatment facilities. Twenty States cite improvements in water quality attributed at least in part to industrial controls. And, although the impacts of nonpoint source control programs can be difficult to quantify, some States report successes in nonpoint source abatement in 1982.

Problems Which Remain

State-reported water quality information, together with EPA information, indicate that there are a number of pollution problems which remain to be solved. For example:

- Municipal and industrial dischargers continue to cause violations of existing water quality standards in a variety of areas in almost all States.

- Most States are affected to some degree by nonpoint sources such as runoff from agricultural operations and acid mine drainage from abandoned mines. In many cases, these sources contribute significantly to the impairment of water uses; in fact, in about one-fifth of the States, nonpoint sources are cited as the most important cause of water degradation.

- Thirty States cite water quality problems due to toxic substances. These toxic substances can come from a variety of sources such as industrial operations, agricultural runoff, and solid waste disposal activities. Because of the tendency of some toxics to accumulate in fish tissue, fishing bans and fish consumption warnings are in effect in a number of waters such as New York's Lake Ontario and Upper Hudson River, and Michigan's Saginaw and Tittabawassee Rivers.

- Ground water problems—due either to contamination or depletion—are reported in over half the States. The most commonly reported causes of ground water problems are waste disposal, landfill leakage, septic tank discharges, and overdrafting.

- States report that excessive nutrient levels are a widespread problem. High nutrient levels particularly affect standing waterbodies such as lakes, and can impair a variety of water uses such as fish propagation and water-based recreation.

- Thirty-seven States report that their waters are affected to some degree by factors other than point and nonpoint source discharges. These factors include flow variations, dam releases, hydrologic modifications such as channelization of streams, and natural conditions.

Implications for National Programs

Implementation of technology-based controls has improved the quality of many of the Nation's rivers and streams. As mentioned previously, a majority of the Nation's waters already meet the 1983 goal of fishable/swimmable quality. Further improvements may be expected as the latest round of BAT regulations are implemented. Nevertheless, some of the Nation's waters will require additional water quality-based controls. The problems in these waters are likely to be among the most difficult to address, especially if they are caused by toxic substances, nonpoint sources, or other factors such as low flow which limit the available capacity of the waterbody to assimilate pollutants. Future progress will depend to an increasing degree on development and implementation of water quality-based controls.

The emphasis given in the 1970s to developing technology-based controls and implementing a permit system meant that EPA placed less emphasis on water quality standards and the water quality-based approach. States were not provided adequate guidance for establishing water quality standards and for applying them in a water quality-based approach to pollution control. With EPA encouragement, States used standards as goals and with few exceptions, set them to reflect the fishable/swimmable 1983 goal of the Act; in many cases there was little analysis of whether these uses and the criteria for meeting them were appropriate for a particular body of water. On the whole, few site-specific analyses were conducted even though, under the Clean Water Act, standards were intended to reflect specific local conditions and priorities. The States were not provided with much information on implementation of water quality standards through the permit and construction grant processes. EPA issued limited technical guidance on how to calculate and apply appropriate models to transform water quality standards into permit limits and design criteria for treatment plants.

Thus far, water quality based-limitations have not been a major component of permits because of EPA's emphasis on the technology-based municipal and industrial components. Only 10 to 20 percent of the major industrial and municipal permits issued have a water quality-based component. Many of these permits were written before the technology-based requirements were published. However, as the technology-based requirements are completed and included in permits, greater emphasis will be placed on including water quality-based components in permits to meet water quality standards, with a particular focus on priority pollutants. In fiscal year 1984, EPA is scheduled to write a number of major industrial permits, about forty percent of which will address significant water quality-based concerns. It is not yet known how many State-issued permits will have water quality-based components, but the number is expected to increase each year.

National Program Directions

Recognizing the progress which has been made in implementing the Clean Water Act to date, and the problems with the water quality-based approach to pollution control discussed above, EPA is taking the following approach in its national program directions:

- EPA will continue its emphasis on technology-based controls. Effluent guidelines to control the industrial discharge of toxic pollutants will be issued. EPA, with the States, will move rapidly to clear the backlog of permits which must be reissued to implement these regulations.
- The water quality-based approach will be strengthened. It can then be applied effectively where needed to control point sources of pollution in the areas that will not meet the fishable/swimmable goal with technology-based controls alone. In addition, EPA will provide the necessary guidance to encourage State and local implementation of nonpoint source controls where needed to achieve or maintain high levels of water quality.

EPA provides national direction for carrying out water quality programs through its Office of Water Operating Guidance and Accountability System. This guidance describes the general approach to be followed in developing and implementing each water program, and outlines an overall management and program evaluation framework. These program and management approaches should form the basis for long term program planning by EPA and State water pollution control agencies. Chapter 2 discusses national program directions in more detail.

2 National Program Directions for the 1980s

This chapter discusses EPA's national program directions for implementation of the Clean Water Act, which combine continued vigorous implementation of technology-based controls with an emphasis on water quality-based controls where necessary to achieve the fishable/swimmable goal of the Clean Water Act. These program directions will be discussed in terms of the technology-based approach (specifically, effluent guidelines) and major elements of the water quality-based approach: water quality standards; monitoring; wasteload allocations; permitting and compliance; nonpoint source control; construction grants; and priority waterbodies.

Technology-Based Approach

EPA is actively developing national regulations, referred to as "effluent guidelines," to control the industrial discharge of toxic pollutants. To date, major strides have been made in the issuance of effluent guidelines. As of December 1983, EPA had promulgated final regulations for 20 industry categories and proposed regulations for 6 others. These guidelines, designed to be environmentally sound and economically achievable, have been proposed and promulgated on schedule, pursuant to a court ordered settlement agreement. EPA will provide technical assistance to State permit writers in implementing the guidelines.

Water Quality-Based Approach

In response to the problems outlined in Chapter 1, EPA has initiated a number of activities to assist States in identifying waters which fail to meet standards after implementation of technology-based controls, and in designing appropriate control measures to ensure that standards are attained. These activities, which include issuance of revised water quality standards regulations, regulatory reforms, guidance documents, and public education, are designed to fully and effectively implement a water quality-based approach to pollution control. EPA has systematically integrated expertise and resources from various offices to better implement the water quality-based approach. EPA is also making a broad range of technical guidance available to the States. This technical guidance covers subjects such as the performance of wasteload allocations for toxic pollutants and the analysis of bioassays of complex industrial effluents. Guidance has also been drafted to assist States in using scientific and technical analyses for setting uses and criteria on a site-specific basis.

EPA's primary objective under the water quality-based approach is to provide the technical support that States need to write appropriate water quality-based permits and make nonpoint source management decisions. EPA will also help the States correlate water pollution control requirements for all sources, both point and nonpoint, with actual attainment and restoration of beneficial uses.

Related objectives are to encourage and help the States to:

- assure that limited State and local resources are directed toward the establishment of water quality-based controls on a carefully planned, priority basis;
- assure adequate control of toxic pollutants;
- provide for adequate public input/discussion throughout the planning process, including designation of beneficial uses to be protected, selection of numeric criteria to protect the designated uses, and calculation of pollutant wasteload models;
- assure the availability of adequate site-specific data for decisionmaking on designated uses and narrative/numeric criteria; and
- implement nonpoint source controls where needed.

State and local agencies will need to concentrate their efforts on highest priority waterbodies. This will require close EPA, State, and local coordination. Success depends in large measure on whether the States, on the basis of EPA policies and program/technical guidance, answer the following basic questions for water quality-limited waterbodies:

(1) What is the use to be protected?

(2) To what extent does pollution contribute to the impairment of the use?

(3) What is the level of point source control necessary to restore or enhance the use?

(4) What is the level of nonpoint source control necessary to restore or enhance the use?

Water Quality Standards

Section 303(c) of the Clean Water Act provides the basis for EPA review and approval of State-adopted or revised water quality standards. Section 303(c) requires States to hold hearings to review these standards at least once every three years and to revise standards where necessary; establishes time limits for various State and federal actions; and provides a mechanism for federal promulgation if the State's action is inconsistent with the requirements of the Act.

EPA assistance to States includes meeting with State officials before standards revisions are initiated to mutually agree upon what standards and waterbodies will be reviewed in detail. This agreement should outline the extent and detail of analyses needed to support any changes in the standards, how the analyses will be conducted, who might be participating in the analyses, the sources of existing data and information, and a schedule for completion of the analyses. EPA assists in the analyses and recommends approaches where needed and requested by the State. This process is designed to encourage a close working partnership between the States and EPA, and to assure the involvement of locally affected parties.

EPA carefully reviews State water quality standards to ensure that the standards meet the requirements of the Act. EPA verifies that beneficial uses have been designated; that the criteria to protect the designated uses are adequate; that the State has followed proper legal procedures in adopting standards; that standards not meeting the Section 101(a)(2) goals are scientifically and technically supportable; and that the State water quality standards include all necessary requirements. EPA also reviews the adequacy of the analyses in support of any changes in the standards. Where the analyses are inadequate, EPA identifies how the analyses should be improved and suggests the type of information or analyses needed. EPA also looks at whether downstream standards are protected.

Total Maximum Daily Loads/ Wasteload Allocations

Section 303(d) of the Act requires States to identify waters requiring more stringent effluent limits and to set priorities and calculate pollutant loads that will ensure implementation of water quality standards. This calculation, a total maximum daily load (TMDL), is expressed as the sum of individual wasteload allocations (WLAs) for point sources, and load allocations (LAs) for nonpoint and natural background sources. Section 303(d)(1)(C) provides that TMDLs be established by the States (with EPA's review and approval) with seasonal variations and a margin of safety to take into account any lack of knowledge concerning the relationship between effluent limitations and water quality.

The results of the TMDL process are adopted in the water quality management plan for the State or area in which the stream is located, and WLAs are included as enforceable effluent limitations in permits issued to dischargers. These permits are part of the National Pollutant Discharge Elimination System, or NPDES, and are the legal basis for requiring dischargers to control the pollutant levels in their effluents. All permits are to comply with the applicable water quality standards. Under Section 401(a)(1) of the Act, States certify that the allowable discharges in permits comply with State standards.

Almost all States have TMDL/WLA programs for at least some conventional pollutants. Thirty-four States have programs currently in place that can handle most major construction grants and major industrial permits. Although these programs are generally limited to conventional pollutants, about ten States with the strongest programs are beginning to address toxic pollutants. Either pollutant-specific techniques or bioassay/biosurvey techniques can be used to establish levels of pollution control needed in order to meet the applicable water quality standards. Pollutant-specific techniques address individual pollutants; bioassay/biosurvey techniques measure the toxicity of total effluents.

Monitoring

EPA and the States must ensure that environmental decisions are based on sound scientific data and information. The EPA is encouraging States to develop a coordinated, balanced approach to water quality monitoring. Water quality data is collected by many different groups—EPA, the U.S. Geological Survey, State agencies, municipalities, local and areawide planning agencies, universities, and the regulated community—for different reasons. EPA is assisting States in establishing a coordinated monitoring program which both avoids duplication of effort and fills in the missing links in our ability to identify and characterize water quality problems and set priorities.

The EPA is emphasizing a water monitoring program which will make more effective use of local, State, and federal resources for collecting, analyzing, and interpreting monitoring data. This program will stress: (1) biosurveys and bioassays to facilitate the analysis of impaired aquatic life uses; (2) local participation in the design and implementation of monitoring programs; (3) continued use of intensive surveys to help analyze the causes and effects of water quality problems; (4) improved design and operation of monitoring programs and improved data analysis techniques; and (5) reporting formats that will meet State needs and also enable status and trend analysis to be reported on a compatible basis nationwide.

Currently, the most pressing need the States face is analyzing use impairments. However, the States have found that it is difficult to identify aquatic life impairments and threats to human health, and to evaluate the causes of use impairments in quantitative terms. This is because only about 25 States have routine biological sampling programs, although almost all States have at least some biological monitoring capabilities. Many States have been experimenting with the use of bioassays in the permitting process. Nevertheless, much work remains to be done to make better use of biological field surveys in evaluating and determining appropriate uses and criteria, and in evaluating the actual use impairments resulting from toxic pollutants and urban runoff problems. The States generally agree with EPA's emphasis on analysis of use impairments. They acknowledge a need to improve in this area and share a willingness to begin pilot efforts to gain experience in biological analyses.

EPA's Office of Water is currently developing policy and technical procedures for using biomonitoring and other techniques in setting water quality-based effluent limits. Biomonitoring includes effluent toxicity tests, bioaccumulation tests, and ecological field studies. It is an important aspect of EPA's water program because it can, in many cases, provide information about water quality impacts which cannot be obtained using other monitoring techniques. In developing biological procedures and guidelines, EPA will build upon a scientific base that has advanced significantly in recent years. EPA will work with State agencies responsible for water quality standards, planning, and monitoring to assure that maximum use is made of available data and resources in the design and implementation of field studies that may include biomonitoring.

In addition, the States and EPA are developing improved methods of reporting environmental progress. States will be placing greater emphasis on the use of Section 305(b) reports for management purposes. The Section 305(b) reports currently are primarily used for public information, emphasizing chemical trends, criteria violation analyses, and local "success stories." States will need to focus management attention on redirecting the reports to place more emphasis on site-specific cause/effect relationships and analyses of impaired uses.

The Association of State and Interstate Water Pollution Control Administrators and EPA are working on a pilot project to improve the States' ability to describe their water program activities and results. This project is designed to produce a concise reporting format that will be used by the States to discuss their water program achievements since 1972. It should also result in recommendations for improving future reporting efforts.

Permitting and Compliance

One of the EPA's primary goals is to increase the involvement of State and local governments in the Agency's decisionmaking and program operation for pollution abatement and control. A major objective of the NPDES program is to assist in the development of new State programs for administering the NPDES program and necessary program modifications by States already having NPDES authority. Thirty-seven States now have NPDES permitting and enforcement authority. Direction will be given to State program approval efforts through the development of State-by-State strategies which will identify obstacles to program approval and present a workplan for overcoming the obstacles.

Municipal compliance will continue as a high priority. Implementation of State municipal compliance strategies should provide the focus for improving municipal compliance. Compliance activities will also be directed to maintain and improve the existing high rate of compliance by nonmunicipal sources. Focus will be on major permittees and their primary industry discharges, and minor permittees that are causing water quality or health problems.

The pretreatment program controls the indirect discharge of priority pollutants by industries to publicly owned treatment works. Municipalities are required to develop a program that will assure that industrial dischargers to municipal wastewater treatment systems will comply with national and industry-specific standards. The regulations require municipalities to have submitted pretreatment programs to EPA or the State for approval by July 1, 1983. By the beginning of FY 1984, 22 percent of a total of 1,675 programs had been approved by EPA and a thousand additional municipalities had submitted at least significant portions of their pretreatment programs. By the end of FY 1984, 68 percent of pretreatment programs are expected to be approved. EPA's highest pretreatment program priority in FY 1984 is completing the review of local pretreatment programs and incorporating approved pretreatment programs into municipal permits where appropriate.

The reissuance of industrial permits will also receive high priority. Priority permitting lists for major sources, developed in accordance with EPA policy, will be used where practical. Under this Policy for the Second Round Issuance of NPDES Permits for Industrial Sources (June 2, 1982), permits will be issued to industries on the basis of a priority system that gives highest priority to facilities where use impairment problems have been identified and where there is enough information to develop water quality-based permits, and to permits needed to implement the new BAT effluent guidelines.

Nonpoint Source Control

Those factors which make nonpoint source pollution difficult to understand—for example, its diffuse nature, the many sources which can contribute to any one problem, and its tendency to be associated with heavy rainfall runoff—also make prevention and control difficult. Implementation of nonpoint source control programs is the responsibility of State and local governments which must weigh the benefits of nonpoint source pollution against the benefits of other services; furthermore, it is often difficult to demonstrate the effectiveness of nonpoint source control practices. These challenges do not mean, however, that nonpoint source pollution is beyond prevention or control.

Under Section 208 of the Clean Water Act, States identified nonpoint source problem areas and developed appropriate solutions. Under Section 303(d), the States must consider nonpoint sources throughout their TMDL/WLA processes, while identifying and ranking waterbodies in terms of the severity of pollution and the importance of designated uses, and when reviewing water quality standards.

EPA recognizes that nonpoint source control programs can contribute to resolving problems in those waters where nonpoint sources, either alone or in combination with point sources, prevent the attainment of designated uses. Therefore, EPA is developing a national nonpoint source policy to assist all public and private interests in controlling nonpoint source pollution. In addition, emphasis will be concentrated on enhancing our understanding of the cause-and-effect relationships of nonpoint source pollution. One example of the special tools being developed to deal with nonpoint source problems is the Nationwide Urban Runoff Program (NURP), designed to assess the nature of urban runoff, its impacts, and the effectiveness of control activities. NURP will be discussed in more detail in Chapter 4.

Construction Grants

Given the large number of wastewater projects being considered for funding under the construction grants program, it is essential that remaining funds be allocated in a manner which most effectively ensures environmental cleanup. EPA, as part of its larger effort to assist States in water quality management activities, is issuing guidance to assist the States in focusing construction grants program funds to projects which will result in the greatest water quality and public health benefits. The importance of these benefits is stressed in the Municipal Wastewater Treatment Construction Grants Amendments of 1981. These amendments link construction grant decisions to water quality standards by requiring that after 1984, no construction grant can be awarded unless water quality standards for the water segment in question have been reviewed and revised as appropriate. EPA construction grant regulations (published interim final on May 12, 1982) are designed to implement the 1981 Amendments. They require that States establish priority systems which consider the impairment of water uses resulting from existing municipal pollutant discharges, and the extent of use restoration or public health improvement that results from the reduction in pollution.

Priority Waterbodies

The processes which translate water quality standards into permits for pollution discharges, and ensure that municipal wastewater treatment plants are built where the greatest benefits will be achieved, offer substantial potential benefits to State and local interests in the form of cost-effective, achievable pollution controls. However, it is clear that implementation of this approach will take considerable time both because of State and local resource limitations and because of the complexity of the decisionmaking process.

To ensure that water cleanup resources are efficiently managed, EPA's water pollution control effort calls for the identification of priority waterbodies. Priority waterbodies are those areas for which pollution abatement and control decisions are needed to prevent or reverse the impairment of a designated use. Factors to be considered in identifying priority waterbodies include, but are not necessarily limited to: the use to be protected, including human health; the severity of the use impairment or the severity expected if no actions are taken; and the margin of environmental benefits expected for the resources expended. Priority waterbodies need not be construed only as "dirty waters;" maintenance of high quality waters and existing water uses are as important as correcting water quality problems. Once priority waterbodies are determined, pollution control actions such as standards setting, wasteload allocations, permit issuance, and nonpoint source programs should be identified and scheduled.

In the 1982 Section 305(b) reports, thirty-nine States and territories provide some information on their waters of concern, usually including a list of specific waterbodies; no information is available for the remaining States. This information is summarized in Appendix A. The results vary considerably from State to State, in part because States use varying definitions of "streams," "segments," and "basins." Many of the States plan to refine and standardize their selection systems for priority waterbodies and are in the process of revising their listings. Nevertheless, it is clear that there are a large number of specific waterbodies which the States believe should receive priority attention. For instance, 27 States and territories which use "segments" as the unit of measure list over 1,500 segments as waters of concern. A wide range of pollutant sources—especially municipal discharges, agricultural and urban runoff, and combined sewer overflows—are reported to affect these waters. Of these sources, municipal discharges are the most commonly reported. Bacteria, dissolved oxygen, nutrients, toxic substances, and suspended solids are the constituents of highest concern in these waterbodies.

3 Water Quality Status

Waters Meeting the 1983 Clean Water Act Goal

The interim goal of the 1972 Clean Water Act states that, wherever attainable, "...water quality which provides for the protection and propagation of fish, shellfish, and wildlife, and provides for recreation in and on the water, be achieved by July 1, 1983." Estimates of the progress toward this goal are provided by 21 States and summarized in Table 1 below. While it is difficult to make a definitive statement concerning progress toward this goal, the data provided by States in the 1982 Section 305(b) reports indicate that the majority of waters meet the interim goal of the Clean Water Act.

Several points should be noted about this information. First, these estimates are based largely on 1981 data and thus are not the final figures on waters meeting the Clean Water Act goal. The 1984 National Water Quality Inventory will include 1983 data and hence contain a more accurate estimate of the Nation's progress toward this goal. Second, the States generally based their estimates on the degree to which their water quality standards were met. As discussed in Chapter 1, applicable State standards may involve designated uses either more or less

Table 1 Waters Meeting the 1983 Goal as Estimated in State Section 305(b) Reports

State	(A) Basis for Estimate	Percent of (A) Currently Meeting Goal	Percent of (A) Expected to Meet Goal	Primary Reason(s) for Nonattainment of Goal
Arkansas	6,239 major stream miles	Not reported	77%	Nonpoint sources
California[1]	27 major streams	85%	Not reported	Nonpoint sources, especially agricultural return flow
Connecticut	963 major river miles	70%	Not reported	Combined sewer overflows; nonpoint pollution; industrial discharges
Georgia	20,000 total stream miles	95%	Not reported	Combined sewer overflows; urban and nonpoint runoff; WWTP discharges
Kansas	62 stream segments	97% fishable, 90% swimmable	100%	Rural runoff, natural conditions
Louisiana	113 segments	Not reported	85%	Pesticides, untreated wastes
Maine	8,600 miles	90%	Not reported	Combined sewer overflow and nonpoint source pollution; also municipal discharges
Maryland	2,684 miles	90%	90%	Suspended solids, nutrients from urban runoff and agricultural runoff
Massachusetts	1,611 assessed miles	48%	Not reported	Nonpoint sources; industrial, municipal, combined sewer sources
New Hampshire	14,500 miles	96.5%	99%	Municipal and industrial waste, combined sewer overflows, untreated domestic discharges
New Mexico	3,500 miles	90%	95%	Point and nonpoint sources
North Dakota	47 segments	Not reported	100%	Natural conditions
Ohio	3,758 miles assessed (out of 43,000)	81%	81%	Point sources and urban nonpoint source runoff
Pennsylvania	12,962 miles	79%	82%	Abandoned mine discharge
Rhode Island	329 miles	66%	Not reported	Municipal and industrial sources, combined sewer overflows
South Carolina	88 segments	90%	Not reported	Not reported
Tennessee	13 basins	Not reported	46%	Point and nonpoint source pollution; surface mining
Texas	16,115 miles classified	91%	97%	Sluggish flows; municipal, industrial waste
Vermont	1,126 miles assessed	84%	100% fishable/ swimmable "where attainable"	Municipal discharges, combined sewer overflows, nonpoint sources
Virginia[1]	27,240 total stream miles	95%	Not reported	Kepone from industrial discharger; mine drainage; abandoned industrial plant; nonpoint sources, especially agricultural
Washington	170 segments	About 60%[2]	Not reported	Nonpoint sources, natural conditions, point sources

[1] 1980 estimates

[2] Includes 39 upstream segments for which definitive information not yet available but which are believed to meet goal

restrictive than the fishable/swimmable goal, and may not reflect local environmental, technological, and economic constraints effectively precluding use attainment. Finally, the States have traditionally assessed their water quality by measuring the frequency with which the chemical constituents of water, such as heavy metals or ammonia, violate established standards of water quality. States are just beginning to assess water quality in terms of use impairments and to conduct biological analyses of water.

Only those States which report on the bases for their estimates of waters meeting the fishable/swimmable goal are included in Table 1; these bases vary widely among States. For example, California bases its estimate on an assessment of 27 major streams, while Georgia uses 20,000 stream miles as the basis for its estimate. Because of these varying methods of assessing goal attainment and because the number of stream miles assessed is only a small fraction of the Nation's total miles of waterways, no quantitative national conclusions should be drawn from these assessments. However, Table 1 does indicate that a majority of the Nation's waters assessed in 1982 meet the interim Clean Water Act goal. The States cite point sources, nonpoint sources, and, to a lesser extent, natural conditions as reasons for nonattainment of the 1983 goal.

State Water Quality Trends

Twenty-one of the 35 States providing overall trend information in the 1982 Section 305(b) reports cite continuing improvement in water quality. For example, New Hampshire reports that 97 miles of streams have improved in quality since the 1980 Section 305(b) report and now meet the interim goal of the Clean Water Act; Mississippi reports that at 31 of 36 trend stations, water quality has either improved or been maintained at good levels; and Wisconsin notes that improving water quality trends are now apparent in that State, particularly for total phosphorus and suspended solids.

Fourteen States report generally stable water quality trends. New Jersey, for example, reports that no significant improvement or decline in water quality is noted over the past four or five years; Arkansas states that its water quality conditions are generally good and stable; and Oregon reports that its initial trend evaluations indicate no appreciable change in water quality between 1976 and 1981.

No Statewide trends of degrading water quality were reported in 1982. However, 29 States report some degrading trends in localized areas. Georgia, for example, notes a decrease in water quality in the Satilla and Ochlocknee Rivers below certain cities. Rhode Island states that monitoring of biological organisms in that State's waters reveals some degradation at selected stations; and in California, 6 of 27 priority streams are reported to show some deterioration in 1980-1981.

It should also be emphasized that trend assessments were made by the States using a variety of methods and for different reporting periods. For example, Virginia bases its assessments on trend analysis of four conventional (i.e., non-toxic) pollutants over a period of record varying from 5 to 15 years; North Carolina reports on the reduction in number of degraded stream segments between 1980 and 1982; Wisconsin compares 1977-1978 pollutant levels to 1980-1981 levels at 44 sites across the State; Kansas reports on trend data for nine rivers gathered since 1967; and in Arkansas, trends are measured using biological monitoring data gathered at 44 sites over the past 4 to 5 years.

Additional Issues

In addition to describing water quality trends and conditions, State Section 305(b) reports provide insights into the sources of water pollution and other water quality issues of concern to States. Information concerning the three primary sources of water degradation traditionally cited by the States—point source discharges, nonpoint source pollution, and natural conditions—are described in the following chapter. Two additional water quality-related issues most commonly cited by the States—ground water pollution and toxics—are discussed below. This brief discussion serves primarily to highlight these special topics to which many States devoted considerable attention in their 1982 reports.

Ground water: Ground water contamination and/or depletion is widely reported in over half the States. Waste disposal, landfill leakage, septic tank discharges, and overdrafting are the most commonly reported causes of ground water problems. Many States report that ground water quality programs are underway to identify problem areas and manage existing supplies. For example:

- In New Mexico, 105 sites with known contamination problems have been identified, and a monitoring program has been implemented based on an inventory of major sources of potential contamination and a Statewide analysis of the vulnerability of aquifers to contamination.

- Wisconsin reports that interagency planning is underway in the State to halt further ground water contamination from irrigation and pesticide runoff.

- Oklahoma reports on the development of ground water quality monitoring programs and a permit issuance program for users of ground water resources. Several studies are being conducted to delineate ground water characteristics and help develop overall ground water standards.

- Oregon reports that it has developed ground water protection guidelines which are supplemented by special control measures in problem areas.

- Washington reports that ground water management in that State is receiving increased attention. A management plan protecting the Spokane Valley aquifer has been completed and certified, and a geohydrologic study has been undertaken for the

130 square miles of the Chamber Creek-Clover Creek aquifer.

- Connecticut reports that it has conducted a ground water inventory and administers a monitoring network of nearly 800 community water supply wells. Ground water sampling is also conducted at landfills and other potential pollution sources.

Toxic pollutants: Toxic pollutants are generally defined as substances which, by themselves or in combination with other substances, may be harmful to life. Many chemicals, when manufactured or used under appropriate conditions, present little risk of adverse impacts on human health or the environment. However, other chemicals can cause severe damage, especially if improperly handled. It is often difficult to quantify adverse impacts on humans and the environment. Gross impacts such as fish kills are obvious. More subtle effects can only be measured using aquatic organisms in acute tests (generally, where mortality is the end result) and chronic tests (generally, where sublethal effects such as impacts on reproduction and growth are the end result). Congress recognized the pervasiveness of toxic substances in the Clean Water Act when it set as national policy that the discharge of toxic pollutants in toxic amounts be prohibited.

Toxic pollutants in water, fish tissue, and bottom sediments can come from a variety of sources including industrial and municipal operations, agricultural runoff, spills, and solid waste disposal. In 1982, thirty States cite standards violations or use impairments due to toxic pollutants.

New York reports that fishing bans and consumption limits have been imposed due to chlorinated organics in Lake Ontario game fish, PCBs in Upper Hudson River fish, and mercury in Onondaga and Cranberry Lakes. A central toxics coordinating group has been established in the State and enforcement procedures strengthened to deal with the toxics problem.

Virginia reports on three toxic problem areas in the State caused by industrial manufacturing operations which have now been halted. Mercury contamination affects two sites—81 miles of the North Fork of the Holston River and 102 miles of the South River/South Fork of the Shenandoah. The pesticide kepone affects 113 miles of the James River estuary. Some evidence exists that clean sediment is burying the old contaminated sediment in the James River, and a downward trend in kepone levels in some fish species is reported.

Michigan reports on health advisories issued by the State banning the consumption of fish from portions of several rivers due to the accumulation of toxics in fish tissue. For example, in the Tittabawassee River downstream from Midland and in the Saginaw River, fish consumption bans are in effect due to the presence of dioxin (TCDD) and polybrominated biphenyls (PBBs).

Louisiana reports that pesticides such as toxaphene, DDT, dieldrin, chlordane, endrin, and lindane are a serious problem in many agricultural areas of the State. Other examples of toxics contamination around the country include PCBs in the Indiana Harbor Ship Canal; toxic hydrocarbons in the Fort Gibson reservoir in Oklahoma; and, in New England, PCB contamination of the Housatonic River and New Bedford Harbor.

Toxic pollutants also are an important issue in the Great Lakes. Michigan reports that toxic substances significantly affect water uses in the Great Lakes. Wisconsin cites a toxic substances survey conducted in the Great Lakes area in 1979/80 which showed excessive levels of PCBs in 30 percent of the fish samples tested; in 1980/81, a second survey revealed an apparent decreasing trend. The study will continue for a third year to identify sources and verify the trend information. Illinois reports that a number of toxic substances have been noted in Lake Michigan fish at levels above the U.S. Food and Drug Administration action levels; however, a decreasing trend is noted for PCBs and DDT in Lake Michigan fish. And according to the New York 1982 report, a variety of toxic pollutants including PCBs, mercury, and mirex have been detected in Lake Champlain, the St. Lawrence River, Lake Ontario, and Lake Erie. A pattern of declining PCB levels is noted for most species tested in Lake Ontario, although more testing is necessary to determine any clear trends. PCB data for Lake Erie and Lake Champlain do indicate declining levels since the mid-1970s.

Levels of toxic substances appear to be declining in some State waters due to pesticide bans and point source controls. For example, declines are reported for chlordane levels in Illinois; copper, cyanide, and mercury levels in Indiana; and PCB levels in Arkansas. The Ohio River Valley Water Sanitation Commission reports major improving trends for cyanide and lead.

It has become clear that more information is needed about toxic pollutants. Over the past five years, EPA has performed an intensive review of available information and has conducted limited amounts of sampling of waterways and effluents to better understand the toxicity, production and use, environmental fate and effects, and potential for human exposure to pollutants in U.S. waters. The results show that in many cases, well-operated and maintained biological and physical/chemical waste treatment systems can remove significant amounts of these pollutants.

- Studies of industrial wastewater samples show that, although the current BPT discharge limits and existing BPT permits were aimed at controlling conventional pollutants, they are at the same time removing toxic organics and heavy metals to a significant degree. The BPT controls on 26 different industries will reduce the direct discharge loading of seven metals and cyanide between 80 and 93 percent from 1972 levels. Zinc, for instance, will be reduced 93 percent; lead, 92 percent; copper, 91 percent; and mercury, 90 percent. It is also estimated that BPT loadings of total phenols from 26 industries are 94 percent less than in 1972.

- A ten-year study of municipal wastewater treatment plants showed that plants meeting secondary treatment requirements provide incidental removal of priority pollutants—approximately 67 percent of the heavy metals; 80 percent of the total volatile organics; and 70 percent of the total acid-base-neutral organic pollutants. Individually, a reduction of 58 percent in copper, 65 percent in chromium, 38 percent in cadmium, and 65 percent in zinc is expected. Loadings of total phenols at levels of secondary treatment are estimated to be 69 percent less today than they were in 1972.

As noted earlier, EPA is currently issuing technology-based BAT effluent guidelines to control toxics from both direct and indirect (i.e., to municipal plants) dischargers. These requirements will be incorporated in permits to be implemented over the next three to four years. However, based upon EPA's Regulatory Impact Assessments and other analyses associated with effluent guidelines, it appears that even with the uniform, national technology-based controls developed by EPA, there may continue to be human health and aquatic life problems from some of these pollutants.

4 Pollution Sources and Control Programs

The 1982 State Section 305(b) reports indicate that both point sources of of pollution, such as municipal and industrial discharges, and nonpoint sources of pollution, such as agricultural and urban runoff, continue to cause violations of existing water quality standards in many areas of the country. Some reports, such as those from New Hampshire, Puerto Rico, and New York, cite point sources as the main causes of water pollution. Other States, such as North Dakota, Kansas, and Utah, find that nonpoint sources are more important contributors of pollution. Finally, States cite a variety of other factors (e.g., low flow and background conditions) as reasons why water segments are not meeting standards.

Point Sources of Pollution

Programs to control point sources of pollution include the construction grants program, industrial discharge controls, and controls on combined sewer overflows and confined animal feedlots. However, the States do not always attribute water quality improvements to only one point source control program. For example, five States report in 1982 that improvements in the quality of their waters are due to a combination of both municipal and industrial treatment plant upgrading and construction.

In Texas, improved municipal and industrial programs are reported to have led to better water quality despite population growth and rising levels of economic activity in the State. Pennsylvania cites improved municipal and industrial sewage treatment as the major reason for a net improvement of 136 stream miles in 1981. Georgia reports on strides made in improved water quality downstream from major metropolitan areas due to industrial and municipal controls instituted since 1970, although problems still exist in these areas. In Mississippi, significant water quality improvements are attributed to the combined effect of construction of new municipal and industrial wastewater treatment facilities, and improved operation and maintenance of existing facilities. New York reports that its water quality has improved measurably due to municipal and industrial point source controls. In the Upper Hudson River, for example, eleven problem discharges have been eliminated in recent years due to municipal and industrial plant construction and upgrading.

The construction grants program, which allocates federal funds to the States for the building and upgrading of municipal sewage treatment plants, has improved the quality of many State waters. In 1982, thirty-six States cite improvements in their waters as a direct result of construction grants. The following are some examples of water quality improvements attributed to municipal construction, as reported by the States in 1982:

- Rhode Island reports significant improvement along the Blackstone River due to completion of sewage treatment plant projects in Massachusetts and Rhode Island.
- Connecticut cites an increase in the recreational use of water and a decreased health risk directly attributed to the construction grants program.
- In Maryland, a trend toward decreasing numbers of acres closed to shellfishing has been tied to improvements in and expansion of waste treatment facilities.
- Alabama reports that construction of 66 new sewage treatment plants has resulted in improved water quality and the elimination of potential health hazards in a number of areas across the State.
- The District of Columbia reports reduced levels of certain pollutants in the Potomac River due to improved effluent quality from the Blue Plains sewage treatment plant. Restoration of the Potomac Estuary is beginning, and many sport fish have returned to the river.
- Decreases in the number of fecal coliform violations in New Mexico over the past two years are attributed to improvements in sewage treatment plants.
- In the Delaware River Basin, dissolved oxygen and fecal coliform levels are reported to have improved below Philadelphia with the completion of wastewater treatment plant (WWTP) upgrading.
- Biological surveys conducted in Illinois' Drummer Creek have revealed substantial improvement in the creek after upgrading of the Gibson City WWTP.
- California reports that construction of a new WWTP which limits its discharges to periods of high flow has been responsible for a significant restoration of water uses on the Russian River.

Some figures on recent reductions in pollutant loadings to streams are available from the 1982 reports. North Carolina notes that in the last thirty years, the amount of organic waste entering that State's WWTPs has more than doubled, yet the amount of organic waste in effluents has been halved. Alabama reports that since the implementation of the Clean Water Act, discharge of primary treated wastes in that State dropped from 65 million gallons per day (MGD) to 10 MGD, and discharge of raw sewage dropped from 2.5 to 0.15 MGD. EPA studies of municipal treatment plants show that secondary treatment plant removal of two principal conventional pollutants, biochemical oxygen demand (BOD) and suspended solids, increased 65 percent in

1980 over 1973 levels of removal. The median toxics removal rates in a sample of 20 WWTPs studied in detail range from 76 percent for metals to 70-85 percent for different types of organic chemicals.

Increases in the number of secondary WWTPs and in the total population served by secondary levels of treatment are major indicators of the success of the construction grants program. EPA studies show that increasing numbers of municipal WWTPs are achieving secondary treatment. In July 1977, 37 percent of the secondary plants required by the Clean Water Act had been constructed; as of June 1983, 69 percent had been built. Some States provide specific information on these increases. Connecticut notes that in 1970, 46 percent of its municipal WWTPs provided secondary treatment; in 1982, that figure climbed to 95 percent. Georgia reports that over 35 percent of municipal plants in that State (discharging 65 percent of total flow) received primary treatment or less in 1968. By 1981, fewer that 5 percent of Georgia's municipal treatment plants were still discharging primary treated wastes, and these accounted for only 2 percent of total flow. In Kansas, all but two WWTPs had achieved secondary treatment levels in 1982. According to the 1981 Michigan Section 305(b) report, the number of people served by secondary treatment in Michigan has risen dramatically, from 900,000 in 1967 to an anticipated 5 million in 1982.

Treatment levels in WWTPs have offset the increase in pollutant loads that have occurred because of increasing population, new sewers, and population shifts. The total amount of pollutants entering the Nation's waters from WWTPs has stayed roughly constant in the last decade, even though the population served increased by 18 million and municipal flow increased by almost 7 billion gallons per day.

The Clean Water Act provides that, if secondary treatment is not enough to protect water quality and public health, advanced levels of treatment may be required. In 1979, the Administrator was directed to review proposed advanced treatment (AT) projects to determine if AT is required and will definitely result in water quality and public health improvements. Over half of the AT projects which have been reviewed by EPA to date have been modified, or elements deferred pending further analysis, because the projects were designed using possibly too conservative water quality criteria, modeling assumptions, and/or design parameters. One result of this AT process has been the diversion of federal funds from project components likely to result in relatively small water quality improvements, to projects more likely to result in relatively large water quality improvements.

The 1982 Section 305(b) reports indicate that industrial facilities, regulated along with municipal WWTPs under NPDES permits, have steadily improved their levels of treatment and decreased their impact on the environment. According to EPA studies, the implementation of BPT regulations is estimated to have reduced industrial discharges of six key pollutants substantially from 1972 to 1977: BOD by 71 percent; suspended solids by 80 percent; oil and grease by 71 percent; dissolved solids by 52 percent; phosphate by 74 percent; and heavy metals by 78 percent. Twenty States cite improvements in water quality attributed at least in part to industrial controls. Some examples of improvements in levels of industrial pollution are as follows:

- Vermont states that the majority of its industrial facilities have achieved best practicable technology (BPT). A 1979 survey of the State's larger industries failed to uncover any serious toxic discharge problems.

- Connecticut reports that dramatic gains in water quality achieved in the late 1970s due to BPT implementation have been maintained.

- Florida reports that industrial controls have been responsible for significant improvements in Escambia Bay.

- In Mississippi, twenty industrial facilities previously out of compliance with their permits are reported to have achieved compliance within the past two years.

- Improved cyanide levels in the Ohio River mainstem are directly attributed to better industrial treatment on the Monongahela River.

- Wisconsin reports that efforts to meet 1977 BPT discharge limits in the State's 47 pulp and paper mills have resulted in a 90 percent decrease in biochemical oxygen demand and a 75 percent decrease in suspended solids discharges from these mills over the past seven years. These reductions in discharges have resulted in improved water quality in a number of areas. In the Flambeau River, for example, no dissolved oxygen (DO) permit violations have been noted since 1978 in an area which once suffered severe DO problems due to paper mill discharges.

In many States, industrial facilities are reported to have a higher rate of permit compliance than municipal facilities. New York reports that the compliance rate for industrial facilities in that State is 81 percent, while only 48 percent of municipal facilities are consistently in compliance. In Wisconsin, over 90 percent of industrial dischargers are reported to be meeting BPT requirements, while 60 percent of municipal dischargers are meeting assigned treatment levels in mid-1982. In Nebraska, 40 percent of municipal wastewater treatment plants are reported to fully comply with permit requirements, while 60 percent of industrial facilities were in compliance in 1981. Oregon reports that fewer industrial than municipal facilities are having trouble meeting permit limits.

EPA studies show that the percentage of major industrial plants in significant non-compliance with their permits decreased from 18 percent in 1981 to 15 percent by December 1982. EPA has placed major emphasis on improving the compliance rate of municipal plants; the percentage of major municipal plants in significant non-compliance with their permits decreased from 27 percent to 22 percent during the same period.

Some improvement in the treatment of combined sewer overflows has also been noted by the States. The District of Columbia reports that combined sewer overflow volume to the Potomac River was reduced by 66 to 70 percent due to simple sewer maintenance repairs. North Dakota states that most of its sites affected by combined sewer overflows are currently involved in sewer separation projects. Nevertheless, combined sewer overflow problems have not generally received the same level of control as other point sources, and in some cases are reported to cause severe degradation.

Some success in the control of runoff from confined animal feedlot operations has been reported by the States. For example, Missouri reports that its feedlot management program has significantly reduced the amount of animal waste entering Missouri streams; the waste has been recycled into crop fertilizer valued at 8.6 million dollars. North Dakota reports that its program to control runoff from animal holding or feedlot facilities has prevented a substantial amount of pollution from entering the State's waters.

Despite decreases in levels of significant industrial and municipal non-compliance and many examples of water quality successes reported as a result of point source controls, point sources of pollution continue to cause significant water degradation. For example, Puerto Rico states that high fecal coliform levels, which indicate the presence of inadequate, overloaded municipal facilities, are its worst water pollution problem; Georgia and Mississippi report that increases in population growth are causing WWTP overloads and, therefore, a need to continuously expand existing facilities; and in Illinois, bottom sediment sampling is reported to reveal a number of metals and other toxics originating from industrial and municipal operations in the Chicago area. Combined sewer overflows are reported to be a major factor in the chronic water quality problems affecting San Francisco Bay, and are reported to be one of the primary reasons for the failure of some Connecticut waters to meet standards. In Rhode Island, combined sewer overflows are reported to be a major reason for shellfish bed closures in Narragansett Bay. Another problem mentioned by the States is the possibility of future increases in water pollution due to intensive energy development projects such as synfuels production and increased oil drilling and coal mining activities.

The most commonly cited reasons for continued point source pollution problems are resource shortfalls which prevent municipal and industrial waste treatment plant construction or upgrading; improper operation and maintenance procedures, especially at small municipal WWTPs run by part-time operators; inadequate pretreatment of industrial wastes; and delays in the facility planning and construction grants process.

Vigorous programs to improve operation and maintenance of WWTPs are underway in many States. Most programs involve formal training and mandatory certification of operators, coupled with more frequent plant inspections. Many States are directing resources to priority waterbodies to better manage their construction grant funds; nevertheless, at least a quarter of the States report that some water quality program needs may be affected by scarce resources. The adverse impacts of delays in the construction grants and facility planning process should be mitigated by the 1981 amendments to the Clean Water Act, by action being taken by many States to improve permit compliance among existing municipal and industrial facilities, and by EPA's recent streamlining of the construction grants regulations. Recent progress has been made in 1982 in reissuing operating permits for municipal and industrial treatment plants. Permitting backlogs continue, however, especially for minor plants.

Nonpoint Sources of Pollution

As point sources of pollution come under control, many States are devoting increasing emphasis to nonpoint sources of pollution. Nonpoint source control programs are developed and implemented by the States, with EPA support. However, they have not been in place as long as have point source controls and their effects are more difficult to quantify. Nevertheless, a number of successes in nonpoint source abatement efforts are reported in the 1982 State Section 305(b) reports. For example:

- Connecticut reports that its nonpoint source program has provided local governments with assistance in dealing with agricultural waste management, erosion, aquifer protection, and other nonpoint source-related issues.
- In North Carolina, better cooperation on limiting sediment runoff from construction operations is reported as more people become aware of the problem and understand ways to limit the transport of sediment. Education programs are also helping reduce agricultural runoff.
- Indiana reports that its agricultural conservation program has been "extremely successful," with four thousand farms now participating in best management practices.
- In Kansas, soil conservation practices, now used on a voluntary basis on many farms throughout the State, are reported to be effective in reducing soil erosion and should result in more complete attainment of goals.
- Nebraska reports that three cost-sharing programs have greatly contributed to the reduction of stream sedimentation in the State.
- North Dakota reports that its nonpoint source program has been very successful in selected areas, especially in developing watershed controls and educational demonstration projects.
- Oregon reports that a sediment control project has demonstrated that cost sharing, loans, and technical assistance to farmers can be successful ways of ensuring the implementation of best management practices.

In general, the use of best management practices to control nonpoint sources of pollution appears to be increasing. Forty-seven States have approved agricultural nonpoint source control programs and 39 States are reported to be taking implementation actions. Sixteen States are implementing regulatory sediment and erosion control programs to control the runoff of pollutants from construction activities. Thirty-seven States have forest practices acts, varying from regulatory to non-regulatory in nature, that are used to some extent to control nonpoint source pollutants. The States are establishing priorities for nonpoint source cleanup by ranking watersheds on the basis of potential public health risks, beneficial uses, and the solvability of the problem. Educational programs and demonstration projects are widely regarded as successful by the States.

Nonpoint source pollution, however, is reported throughout the country. In about a fifth of the States, nonpoint sources are cited as the most important cause of water degradation. In addition, most States are affected to some degree by nonpoint sources; in many cases, these sources contribute significantly to the impairment of water uses. Pennsylvania, West Virginia, Tennessee, Kentucky, and the Ohio River area are reported to be severely affected by acid mine drainage and coal mine runoff. Indiana reports that fish kills due to agricultural operations such as the use of agrichemicals account for an increasing percentage of total fish kill incidents; and in Illinois, agricultural operations are said to be responsible for half of the reported fish kills. In Pennsylvania, where acid mine drainage in combination with other sources is responsible for standards violations in nearly 75 percent of those 2,744 stream miles which do not meet standards, some progress in mine drainage abatement has reportedly been made in the past few years but is expected to slow due to limited resources. Another problem mentioned by the States is the sparseness of information on the extent, causes, and effects of nonpoint source pollution. In the case of Texas, this has prevented the setting of site-specific controls in most areas of the State.

More information must yet be gathered on a number of nonpoint source issues such as the specific cause-and-effect impacts of these pollution sources on receiving waters. These impacts can be difficult to determine because nonpoint source pollutants are usually transported to receiving waters by rainfall runoff, and hence occur during periods of high stream flow. In addition, they are often attached to soil particles and may not be in a chemical form that immediately affects aquatic life.

Long term studies of waters suspected to be degraded by nonpoint sources are in progress in many areas of the country, and should provide better information on which to base abatement measures. The Nationwide Urban Runoff Program (NURP) is one such effort designed to assess the nature and impacts of urban runoff, as well as the effectiveness of various control activities. NURP results indicate that urban runoff can contribute to impairment of water uses such as shellfishing and water-based recreation. However, the potential for such use impairments has been shown to be heavily influenced by local climatology and hydrology, and by the type of waterbody receiving the urban runoff. For instance, the impact of urban runoff has been found to be greatest in small urban impoundments which receive no other influent flows, and in small sluggish streams that originate in urban areas. Various urban runoff control practices such as street sweeping and the use of detention and recharge basins are being studied to determine best possible controls.

Nonpoint sources of pollution produce significant amounts of nutrients which adversely affect many of the Nation's lakes. Eutrophication is the "aging" of waterbodies (primarily lakes and other standing waterbodies) caused by nutrient enrichment. High nutrient levels can stimulate the growth of unsightly algae and weeds which, in turn, affect fish populations and recreational water uses. Although eutrophication occurs naturally in lakes over time, man's activities have in many instances accelerated the process. For example, urban runoff and drainage from cultivated farmlands are significant sources of nutrients and sediments; municipal and industrial discharges are also often rich in nutrients such as phosphorus and nitrogen.

By 1982, many States were in the process of classifying their lakes according to trophic status (degree of eutrophication) and establishing priorities for cleanup. The following table summarizes State-reported levels of eutrophication. Most States have classified only a portion of their total number of lakes according to trophic status.

Table 2 Lake Eutrophication

State	Number of Lakes Classified	Percent of Classified Lakes which are Eutrophic
Connecticut	70	27
Iowa	107	100
Kentucky	45	64
Minnesota	500	70
Ohio	119	84
Pennsylvania	26	81
Puerto Rico	22	81
Tennessee	112	48
Virginia	161	35
Washington	123	18
Wisconsin	1,500	18

Other Factors

A variety of factors other than point or nonpoint source discharges affect the use of the Nation's waters. The most commonly reported factors include low flow or stream flow variations, dam releases, channelization and other hydrologic modifications, and natural sources of pollution. Thirty-seven States report that their waters are affected to some degree by these factors, which are widely found across all geographic areas. In a number of States, these factors are reported to cause repeated standards violations and impairment of designated uses. For example:

- The North Dakota 1982 Section 305(b) report indicates that water quality degradation in the State results from natural substances occurring in the soils; this degradation is aggravated by point and nonpoint sources. Naturally occurring sodium in the Missouri River Basin impairs irrigation uses; intermittent or low flow reduces the capacity of some streams to support fish populations; and steep stream banks, extreme flow fluctuations, and unstable, silty riverbeds naturally impair fishing and swimming uses in some rivers.

- In Massachusetts, impoundments on the Ten Mile River are reported to create conditions leading to eutrophication and sedimentation. In addition, reservoir releases which cause water level fluctuations are reported to limit populations of bottom-dwelling aquatic organisms in the Little River.

- New York reports that some streams in that State have little or no flow in the summer months due to flow regulation for navigation or power generation purposes; these "stress segments" cannot adequately dilute discharged wastes. In addition, canalization of the Mohawk River causes nutrient and sediment traps and encourages the growth of nuisance aquatic vegetation.

- New Mexico reports that water level fluctuations are the single most important factor affecting fish management in mainstem reservoirs. Hydrologic modification and diversion of stream flow are partially responsible for one stream's failure to meet standards. One aspect of normal dam operation—the release of reservoir bottom waters—is reported to be responsible for occasional dissolved oxygen and phosphorus standards violations in three streams.

- In Texas, naturally sluggish stream flow and resultant low assimilative capacities are reported to magnify the effects of point sources and therefore contribute to a majority of the State's water quality problems.

- Many States report that drought conditions experienced in 1980 and 1981 led to low flow problems and concentration of chemical pollutants in available water.

5

Costs and Benefits of Meeting the Clean Water Act Goal

In their 1982 Section 305(b) reports, most States provide some discussion of the costs and benefits of certain water pollution control programs, although few States provide actual cost/benefit analyses. A common theme of most discussions is that many of the benefits of clean water, such as aesthetic enjoyment and increased recreational use, are intangible and cannot be easily measured in dollars.

As reported by the States, some of the benefits of cleaner water include increased recreational opportunities, and hence, more tourist income and income resulting from the sale of recreational products; increased and improved commercial fishing and shellfishing; reduction in waterborne diseases; increased value of waterfront property; increased agricultural productivity through the conservation of topsoil; decreased cost of water treatment for public water supplies; and reduced influent or raw water treatment costs for industrial users.

Additional benefits have been reported to result from the construction grants program, including employment of construction personnel in the building of waste treatment plants; relocation of industries to cities that have upgraded their waste treatment facilities; doubling of crop production where spray irrigation of highly treated effluent is used; use of stabilization ponds as waterfowl production areas; and financial savings to homeowners who would otherwise maintain and operate individual septic tanks. Few of these benefits can be measured quantitatively for use in cost/benefit comparisons.

Many costs are also difficult to assess. Besides the direct cost of financing and maintaining pollution abatement facilities, indirect costs and impacts can also be weighed. These indirect costs include the possible closure of older industrial plants which are not able to afford the cost of retrofitting outmoded pollution abatement equipment in addition to other plant modernization costs, and declines in public services or increases in taxes as municipalities spend more money financing waste treatment facilities.

Despite the difficulties of calculating these costs and benefits, some States performed partial cost and benefit analyses of water pollution control programs, using best available information. Minnesota, for example, provides specific information on costs and benefits in its 1982 report. The cost of achieving the fishable/swimmable goal in the Mississippi River near Minneapolis-St. Paul was evaluated, as well as the amount citizens were willing to pay for cleanup. This area of the Mississippi is affected by water quality standard violations for dissolved oxygen, ammonia, and residual chlorine; contamination with industrial wastes such as copper, cadmium, and mercury; and combined sewer overflows (CSOs). CSOs are the primary obstacle to achieving the swimmable goal in this section of the river, and account for 98 percent of the summer loading of fecal coliform bacteria to the area.

A Minnesota CSO study concluded that the preferred solution to the problem would require a combination of new interceptors, sewer separation, storage and treatment. The estimated capital cost for such improvements was determined to be 349 million dollars, which translates into an annual charge of $41 per household in the Minneapolis-St. Paul area. A survey conducted for the Metropolitan Waste Control Commission asked area residents how willing they were to pay for fishable and swimmable water in this section of the Mississippi River; it was determined that individual households are willing to pay between $44 and $67 each per year. The benefits to local residents of improvement in water quality—estimated to range between 38 and 57 million dollars per year—are expected to increase over time as recreational demands escalate.

Kansas reports that it assessed the cost and benefit implications of water quality management programs conducted under Section 208 of the Clean Water Act. Capital, operation and maintenance, and program administration costs for three different levels of treatment—existing, intermediate, and full—were identified. Five benefit categories were also assessed: agricultural benefits; municipal benefits; industrial benefits; recreational and aesthetic benefits; and health benefits. Benefit-cost ratios were determined by comparing the present value of the total benefits to the present value of the cost to obtain those benefits. Kansas' benefit-cost assessment indicated that full levels of treatment, roughly equivalent to the concept of "zero discharge of pollutants," would not be environmentally or economically feasible. A water quality management plan incorporating elements of the intermediate levels of treatment program for agricultural runoff and mineral intrusion, with elements of the existing nonpoint source control program, was adopted by the State as a result of this analysis. The 20-year cost of this plan was estimated at 280 million dollars, with benefits to the State over this period estimated at 843 million dollars.

A third partial cost/benefit analysis, conducted as part of Missouri's water quality management plan, is reported in 1982. According to the Missouri Section 305(b) report, the expense of soil conservation measures was assessed against the savings realized from conserving topsoils and so maintaining agricultural productivity. This study found that the cost of the program was justified by a reduction in long term productivity losses only in shallow topsoil areas where loss of topsoil will become critical in 30 to 60 years. In deeper soil areas, reduced productivity losses did not balance erosion control expenditures.

The Missouri report notes that an incentive program is necessary to gain widespread farmer participation in the program, as the short term returns from such a nonpoint source pollution control program are small compared to the costs.

Cost/benefit analyses are not yet in wide enough use to permit national assessments of water pollution control programs. From the examples cited above, it is apparent that the process of assessing the benefits of clean water needs to be refined, and that more precise information on costs must still be gathered before comprehensive conclusions about the costs and benefits of the wide range of water cleanup efforts will be possible. However, despite these analytical limitations, the State Section 305(b) reports clearly show that the Nation's investment in pollution control has resulted in many highly valuable, if often intangible, benefits.

Glossary

Acute toxicity: Any toxic effect that is produced within a short period of time, usually within 24-96 hours. Although the effect most frequently considered is mortality, any harmful biological effect may be the end result of acute toxicity.

Aquifer: Water-bearing geologic formation from which drinking water supplies are often drawn.

Bioaccumulation: The process by which certain organisms remove substances, including some toxics, from their environment and store them in their tissues. The concentration of these substances increases at each higher step in the food chain.

Bioassay: A process for determining the biological effect of some substance, factor, or condition and employing living organisms or cells as the indicator.

Chronic toxicity: Toxicity marked by long duration that produces an adverse effect on organisms. The end result of chronic toxicity can be death, although the usual effects are sublethal (e.g., reduced growth, inhibited reproduction).

Combined sewer overflows: Discharges occurring when excessive rainfall is added to normal sewage flows in systems where storm and sanitary sewers are combined.

Effluent: Outflow discharged from an industrial or municipal wastewater treatment plant into a body of water such as a river or stream.

Load Allocation: The portion of a receiving water's loading capacity (defined as the greatest amount of loading that a water can receive without violating water quality standards) that is attributed either to one of its existing or future nonpoint sources of pollution or to natural background sources.

Minor permittees: Municipal and industrial wastewater treatment facilities designated under an EPA priority system as having less impact on receiving waters (because of less flow, fewer toxic constituents in effluents, etc.) than other, higher priority major permittees.

Nonpoint source pollution: Diffused pollution resulting from water runoff from urban areas, construction sites, agricultural and silvicultural operations, etc.

NPDES: National Pollutant Discharge Elimination System; permit program imposing discharge limitations on point source dischargers based on national performance standards for new sources, or on water quality standards.

Point source pollution: Pollution discharged through a pipe or other discrete source from municipal wastewater treatment plants, factories, confined animal feedlots, or combined sewers.

Primary treatment: First stage in the basic treatment of sewage that removes settleable or floating material using screens and settling tanks.

Priority pollutants: Toxic pollutants designated for control under Section 307(a)(1) of the Clean Water Act because of their suspected high toxicity and persistence in the environment.

Secondary treatment: Second stage in wastewater treatment systems in which bacteria consume the organic content of wastes in trickling filters or through the activated sludge process.

Total Maximum Daily Load: The sum of the individual wasteload allocations for point sources and load allocations for nonpoint sources and natural background.

Wasteload Allocation: The portion of a receiving water's loading capacity that is allocated to one of its existing or future point sources of pollution. WLAs constitute a type of water quality-based effluent limitation.

Waters of concern: Waters identified by the States as actual or potential problem areas that require management attention.

Appendix A

Waters of Concern Identified in 1982 State Section 305(b) Reports

State	State Definition and/or Methodology for Selecting Waters	Number	Source of Pollution	Parameters of Concern	Comments
Arizona	Streams cited in list of most serious WQ problems**	9 streams	Municipal dischargers, mines, feedlots, NPS pollution	Metals, nitrates, fecal coliforms, phosphorus	
Arkansas	Planning segment ranking*	39 segments	Not identified	DO, nutrients, toxics (metals)	
California	Identified by WQ data**	58 segments	Nonpoint, point	DO, nutrients, toxics, suspended solids	19 segments are WQL, 39 segments are EL
Connecticut	Identified by not meeting WQ standards**	31 segments	Combined sewer overflows, WWTP, industrial wastes	Not identified	
District of Columbia	Major tributary problems*	10 segments	Storm sewers, dumping	Not identified	
Florida	Water quality problem areas*	23 basins/segments out of 83	Municipal and industrial wastes, urban and agricultural runoff	DO, nutrients, bacteria	
Georgia	Major problem areas*	6 segments	Municipal wastes, urban runoff, sewer overflows	Bacteria, DO	
Illinois	Indicated by WQI**	20% of streams exhibit greater than moderate or severe pollution problems	Not identified	Bacteria, metals, DO	
Iowa	Identified by not meeting WQ standards**	38 segments	Point and nonpoint sources	Bacteria, ammonia	2.4% of over 10,000 observations showed standards violations
Louisiana	Identified as severely polluted**	18 segments	Agriculture, industrial and municipal wastes, urban runoff, hydrologic modification, salt water intrusion	DO, bacteria, turbidity, toxics	14 segments are EL 4 segments are WQL
Maine	Segments not meeting assigned use classifications**	7 segments	Municipal, industrial, combined sewer overflow, stormwater runoff	Solids, nutrients, DO, fecal coliforms, salinity, pH, hazardous materials, metals	
Maryland	Priority segments*	19 of about 180 segments	Municipal wastes, agriculture and urban runoff	Nutrients, suspended solids, bacteria	19 segments are WQL and have impaired uses
Massachusetts	Identified by standards violations**	169 segments	Municipal wastes, urban runoff, sewer overflows	DO, bacteria, nutrients	
Minnesota	Use impairment regarding fishable/swimmable goals**	Not identified	NPS pollution	Nutrients, suspended solids, bacteria	
Mississippi	Problem areas*	7 problem areas	Municipal wastes, agricultural runoff, industrial wastes	Bacteria, toxics, DO	
Missouri	Identified by not meeting WQ standards*	About 130 segments	Municipal wastes; agricultural, mine, and surface runoff; others	DO, deposited solids, fecal coliforms, toxics, pH, others	All segments have some water use impairment (primarily for aquatic life)
Montana	Apparent and potential problem stream segments**	32 of 216 segments	Municipal wastes, agricultural runoff, abandoned mines, other nonpoint runoff	Metals, suspended and dissolved solids, nutrients, others	Some degree of aquatic life impairment in 15 of 32 segments
Nebraska	a. Identified by beneficial use evaluation**	11 out of 13 basins	Nonpoint runoff, feedlots, municipal wastes	Bacteria	11 out of 13 basins are potentially not suited for assigned use
	b. Priority ranking of potential toxic pollutant problems**	4 out of 13 basins	Municipal and industrial wastes	Toxics (metals and organics)	
New Hampshire	Problem segments*	60 segments	Municipal wastes	DO, bacteria	
New Jersey	Priority ranking system prioritizes State watersheds*	29 segments (watersheds)	Not identified	Bacteria, nutrients, DO, toxics	All 29 segments have some water use impairment

Waters of Concern Identified in 1982 State Section 305(b) Reports (Continued)

State	State Definition and/or Methodology for Selecting Waters	Number	Source of Pollution	Parameters of Concern	Comments
New Mexico	Identified by significant standards violations**	6 of 59 segments	Municipal wastes, terrestrial runoff	DO, bacteria, nutrients	7 segments are WQL
New York	Priority basins*	6 basins out of 17, 40% of total area	Municipal and industrial wastes, combined sewer overflows, urban runoff, hazardous wastes	Bacteria, nutrients, toxics, DO, oil/hazardous substances	
North Carolina	Priority waterbodies*	5 segments	Industrial and municipal wastes, agricultural runoff	Mercury, nutrients	
Oklahoma	Identified as having problems of major severity based on chemical evaluation (frequent effects)**	30 segments	Only potential sources identified	Nutrients, suspended solids, heavy metals, toxics, dissolved solids, bacteria	
Oregon	a. Identified as streams with serious nonpoint source problems**	Certain streams within 19 basins	Erosion and sedimentation, animal wastes, agriculture	Not identified	
	b. Identified as streams with point source problems**	Certain streams within 10 basins	Municipal sources	Bacteria	
Pennsylvania	Segment priority categories (municipal grant program ranking system)*	208 segments (priority category 1)	Municipal and industrial wastes, combined sewer overflows, urban runoff, mine drainage	BOD/DO, ammonia, suspended solids, phosphorus, pH	Over 800 segments are WQL
Puerto Rico	Identified by frequency of violations of surface water quality standards**	1 region out of 4	Municipal and industrial waste, agricultural runoff	Bacteria, DO, phosphorus	One WQL segment, eleven "marginal" segments
Rhode Island	Impaired use segments*	18 segments	Municipal and industrial wastes, agricultural runoff	Bacteria, DO	16% of total stream miles have impairment of designated use
South Carolina	Statewide ranking*	53 segments	Not identified	Metals, bacteria, nutrients, DO	
Texas	Statewide ranking*	311 segments	Municipal and industrial wastes	DO, nutrients, bacteria	69 segments are WQL, 44 segments contact recreation impaired, 4 segments propagation of fish & wildlife impaired, 128 segments domestic raw water supply impaired, 19.5% of stream miles not in compliance with WQ standards
Utah	Priority segments*	21 segments	Agricultural runoff, municipal wastes, mining activities	Nutrients, bacteria, BOD, phenols, salinity, suspended solids	A severity index associated with impaired uses is given by stream segments
Vermont	Receive State focus**	124 segments	Municipal and industrial wastes, combined sewers, nonpoint sources	Bacteria, DO	45 segments are WQL, 79 segments are EL
Virgin Islands	Water pollution control priority list*	8 harbors/bays	Municipal wastes	Bacteria, turbidity	
Virginia	Toxic substance problem areas*	3 segments	Chemical manufacturers	Kepone, mercury	These segments do not meet fishable criteria
Washington	Identified as segments experiencing water quality problems excluding those due to natural or irreversible causes*	7 high priority, 26 others	Industrial site drainage, municipal wastes, sewer overflows	Bacteria, toxics	
West Virginia	Problem areas*	3 segments	Municipal and industrial wastes, mine drainage	Phenols, mercury, PCBs, acid mine drainage	
Wisconsin	Priority watershed program*	120 out of 330 watersheds	Agricultural runoff	Nutrients, suspended solids	
Wyoming	Priority segments*	40 segments	Municipal wastes, natural runoff, irrigation, agricultural runoff	Nutrients, suspended solids, bacteria	24 segments are WQL, all have impairment of designated uses

Abbreviations:
NPS - Nonpoint sources
WQ - Water quality
WWTP - Wastewater treatment plant
WQI - Water quality index
WQL - Water quality limited
EL - Effluent limited
DO - Dissolved oxygen
BOD - Biochemical oxygen demand

*Specifically designated by State as problem/priority waterbodies
**Not specifically designated by State as problem/priority waterbodies; however, data indicate likely problem areas

Appendix B

Summary Excerpts of State Section 305(b) Reports

Alabama

For complete copies of the Alabama 305(b) Report, contact:

Alabama Department of Environmental Management
State Capitol
Montgomery, AL 36104

Summary

The Alabama Water Improvement Commission (AWIC) maintains a network of ambient monitoring stations to detect trends in water quality throughout the State. A total of 57 stations are maintained by the State, of which 27 belong to the Environmental Protection Agency's (EPA) national core network of stations.

During the report period (1980-1981), water quality in the majority of the State's lakes, rivers, and streams was good to excellent. A discussion and evaluation of water quality by river basin is included in this report. Also discussed are the various programs the State utilizes to gather information and to control pollution from point and nonpoint sources.

Since enactment of PL 92-500, Alabama has reduced the discharge of primarily treated waste from 65 million gallons per day (MGD) to 10 MGD. The amount of raw discharge has been reduced from 2.5 MGD to 0.15 MGD and the last raw discharge will be replaced during 1983. A total of 66 public waste treatment facilities have been constructed during the period. Construction of these waste treatment facilities has resulted in improvement in water quality and elimination of potential health hazards in a number of areas throughout the State.

The Alabama Water Improvement Commission issued or re-issued 118 NPDES permits during 1980 and 1981. Many of these permits contained schedules requiring construction of new facilities and completion of pretreatment programs. The Commission plans to issue or re-issue 120 municipal permits during 1982.

During 1980-1981, 14 municipal waste treatment facilities were completed with the assistance of federal construction grant funds. The total cost of the facilities was approximately 28 million dollars. Ten of the completed projects provided for replacement of overloaded or inadequate facilities; three provided sewer service where none previously existed; and one provided for elimination of a raw sewage discharge.

The Commission will continue to assign top priority to expediting federal grant applications for needed municipal construction. A priority list prepared by the Commission for fiscal year 1982 indicated a need of 100 million dollars for each of the next three to four years. In fiscal year 1982, 120 million dollars are needed to cover projects which are ready to proceed.

Since most industry in Alabama met the 1977 treatment levels, little water quality improvement was noted in 1980-1981 due to industry upgrading of treatment facilities. Noteworthy, however, is the fact that further industrial development and mining activity occurred during this period without a decline in water quality.

As further growth and industrial activity occurs, more frequent water quality studies and ambient monitoring will be required as more and more demand is put on the State's fixed stream capacity. This is particularly true in light of the new environmental view that maintaining water quality takes precedence over class imposition of effluent standards and on the expected emphasis on toxics control.

Alaska

For complete copies of the Alaska 305(b) Report, contact:

State of Alaska
Department of Environmental Conservation
Pouch O
Juneau, Alaska 99811

Summary

The following statements summarize the various types and sources of water pollution in Alaska today. Three primary concerns are discussed: threats to public health; damage resulting from natural resource harvesting; and nuisance problems.

Health Concerns: The first and most serious priority of Alaska's Department of Environmental Conservation (DEC) is protecting human health. Preventing such public health problems as contamination of drinking water supplies by sewage and toxic wastes, and public exposure to untreated wastes from leaking sewers or failing septic tanks, are the DEC's primary concerns.

Environmental Concerns: Environmental damage in Alaska results primarily from harvesting of natural resources rather than from discharges from pipes (point sources of pollution). Resources that are netted, trapped, dredged, sluiced, drilled, dug, felled, and otherwise harvested are then trimmed and transported out of Alaska for further refining. Environmental damage results from the remains of these activities—for example, mine tailings, sediments, drilling muds, carcasses, bark, and sawdust—as well as from construction and use of roads, docks, and airports to move these resources to markets. Erosion from poorly designed roads dump silt and mud into sensitive streams, fouling fish spawning areas. Intertidal fills create land out of water, obliterating bottom-dwelling animals and eliminating valuable feeding and refuge areas for migrating salmon fry and other species.

Nuisance Concerns: Stream beds littered with cans and debris affect water-based recreational activities in Alaska. Although litter is strictly a nuisance matter, Alaskans who were recently surveyed overwhelmingly listed it as Alaska's number one environmental problem.

Innate uncertainties are involved in predicting Alaska's future water pollution concerns. Resource harvesting and resultant environmental damages depend on market conditions. For example, mining and timber harvesting activities are largely based on the price of metals and logs. Similarly, construction of an Alaskan natural gas pipeline hinges on the price of gas. Possibilities also exist for oil spills caused by tanker accidents or oil well blow-outs.

The following table summarizes in more detail Alaska's water pollution concerns for 1983.

Scale of Problem Type of Activity	Pollution Type	Estimated Extent or Area Affected
Significant		
Subdivisions	Sewage bacteria	Hundreds of households
Placer mining	Mud, silt	600 interior streams
Timber harvesting	Bark deposits	About 150 marine sites
	Temperature	About 100 streams
Intermediate		
Seafood processing	Fish wastes	Several major harbors and several smaller harbors
Intertidal, wetland fills	Physical burial, silt from erosion	Coastal and wetland areas (about 500 developments yearly)
Streamside development	Runoff, silt	Fifty streams in ten coastal cities
Minor		
Large sewage discharges	Sewage bacteria	Four coastal cities
Pulp mills	Suspended solids	Two bays in SE Alaska
Recreational lakes	Residential sewage, silt from runoff	A dozen or more lakes
Potential		
Agriculture	Silt	None yet
Hardrock mining	Heavy metals, tailings, silt	None yet

American Samoa

For complete copies of the American Samoa 305(b) Report, contact:

Environmental Quality Commission
Office of the Governor
Pago Pago, American Samoa 96799

Summary

There are approximately 120 streams in American Samoa. The water quality of these streams is influenced largely by the prevailing weather conditions. During periods of dry weather, many of the stream flows diminish significantly; some dry up completely. Periods of heavy rains and erosion cause large increases in turbidity, suspended solids, and coliform concentrations.

There are only limited data available that establish the types and concentrations of nutrients, heavy metals, pesticides, or other toxic substances that may be present in these streams. The Environmental Quality Commission is continuing its baseline water quality survey of all public water supplies.

Water supply and wastewater collection and treatment are steadily improving. Through educational programs, the public is becoming aware of the importance of proper waste disposal practices and a safe water supply.

Past problems with the disposal of cannery sludges in landfills have been solved through a controlled ocean dumping program.

The sea surrounding these tropical islands is pristine; however, coastal zones are beginning to reflect the impact of modernization. Road construction is resulting in erosion and siltation of fragile coral reef systems along the shore.

The natural wetlands of American Samoa are of two main types: mangrove forests and coastal marsh. These wetlands are threatened by development and agricultural fill operations. Several activities to assure protection of the Territory's wetlands are planned. Included among them are careful review and enforcement of permits and projects related to development in fragile areas; publication of a coastal atlas that contains an inventory of all fragile areas; and development of specific programs to protect and restore these lowlands.

As agricultural programs are developing in American Samoa, pesticides are being more widely used. The government has set up a certification program for users which should prevent any major problems from occurring.

Ground water is the Territory's primary potable water supply source. The Tafuna-Leone plain supply is subject to salt water intrusion and is sensitive to contamination by leachate from activities above the water supply. The supply has been greatly diminished during periods of drought; however, with proper management there should be an adequate supply.

Arizona

For complete copies of the Arizona 305(b) Report, contact:

Arizona Department of Health Services
Division of Environmental Health Services
Bureau of Water Quality Control
1740 W. Adams St.
Phoenix, AZ 85007

Summary

The quality of Arizona's surface water at this writing is generally good. While new problems have been discovered since 1979, others have been resolved or are in the process of being resolved. Nonpoint sources (surface mining and recreation) need to be dealt with vigorously and systematically before major improvements will be seen. Overall, State surface water quality has neither improved nor declined since 1979.

The 1983 goal under the federal Clean Water Act promotes the attainment of water quality for the protection of aquatic life and wildlife, and for recreation. In Arizona, natural conditions preclude many in-stream uses throughout the year. Precipitation extremes cause many unregulated streams to be dry or running full with flood flows. Regulated rivers and streams are totally diverted for irrigation, municipal, and industrial water deliveries, except during flood flows. The presence of flood flows and the absence of perennial base flows in many of Arizona's watercourses prevent the use of some surface waters for uses protected under the 1983 goal.

During water years 1980-1981, several serious water quality problems were discovered in Arizona. Many current problems in the State resulted from historic activities. While overall surface water quality in the State remains good in spite of local pollution, ground water problems now threaten supplies to major metropolitan areas.

Trichloroethylene (TCE) contamination of ground water was found in Tucson and the greater Phoenix area. The Tucson situation is especially severe; the quantities of TCE in the local aquifer are large, there is potential for spread of contamination, and Tucson is currently solely dependent upon ground water for its municipal supply. Levels of TCE in some Tucson and Phoenix area wells are above levels that would pose a chronic health threat if the wells were used as drinking water supplies.

Severe nitrate contamination was detected in the San Pedro River near St. David and Palominas in surface and ground water. Municipal wells in the Phoenix area have been shut down due to high nitrate levels.

Mine wastes from historic operations release acid and heavy metals to a number of small Arizona streams, including Bitter Creek, Harshaw Creek, Lynx Creek, and Boulder Creek. Mitigation in most cases will prove difficult, preventing attainment of the 1983 goal of the Clean Water Act.

Some operating mines have taken action to clean up previous water quality problems caused by their operations. Such actions have apparently been effective in restoring stream quality. However, currently operating mines on the Pinal Creek watershed near Globe-Miami are responsible for severe pollution. Studies in the area are ongoing.

Recreation and recreation-based development have caused bacterial contamination and accelerated eutrophication of Arizona's waters. Bacterial problems are especially severe in the Pinetop-Lakeside area, and in certain low desert impoundments. Accelerated eutrophication is taking place in many small lakes in the White Mountains.

Improper sewage disposal remains a problem in Nogales and in the Cottonwood-Clarkdale area along the Verde River. Plans are being drawn to improve existing facilities in Payson and Summerhaven to alleviate problems in the American Gulch/East Verde River system and Sabino Creek, respectively.

Continuing water quality impacts from the 1979 releases of radioactive tailings water from the United Nuclear Mine near Gallup, New Mexico, remain unquantified. At last sampling, surface water in the Rio Puerco contained gross alpha activity levels in excess of State standards.

Arkansas

For complete copies of the Arkansas 305(b) Report, contact:

Arkansas Department of Pollution Control and Ecology
8001 National Drive
Little Rock, AR 72209

Summary

Of the 6,239 miles of major Arkansas streams, it is projected that 4,087 miles, or 77 percent, will meet the 1983 goal. Nonpoint source pollution causes the remaining 23 percent of stream miles to fall short of the goal.

Reasons for the goal not being attainable are discussed. Briefly, the Delta streams, including Cache River, Bayou DeView, L'Anguille River, St. Francis River, Little River, Tyronza River, Big Creek, Bayou Two Prairie, Bayou Meto, LaGrue Bayou, Bayou Bartholomew, Boeuf River, Bayou Macon, and virtually all of their tributaries cannot be expected to meet the 1983 goal due to physical manipulation of the stream environment: dredging, stream channelization, the clearing of entire watersheds for intensive agriculture, and the resulting nonpoint source pollution by silt, pesticides, nutrients, and organic material.

In these streams, mean fecal coliform levels almost invariably exceed the criteria for swimming. This is true both near sewage discharges which are amenable to control, and in areas far removed from point sources of pollution. Turbidity levels also discourage many recreational activities.

Generally speaking, the highly agricultural Delta region of Arkansas is heavily influenced by nonpoint source pollutants, especially those related to agricultural runoff, i.e., turbidity, suspended solids, and nutrients. The Ouachita River drainage is showing some degrading trends for dissolved oxygen, nutrients, and total dissolved solids. North Arkansas is showing the effects of current land changes where hardwood forests are being converted to pasturelands. These changes are increasing the levels of silts and suspended sediments being measured in surface waters. The extreme northwest region of the State is experiencing a decline in water quality due to increasing population and increased land application of animal waste. The southwest area of Arkansas still exhibits some signs of past petroleum production.

The poor conditions and degrading trends observed at some biological monitoring stations were counterbalanced by good conditions and improving trends at others. This results in assignments of fair conditions and stable trends for each of the Arkansas, White, Ouachita, Red, and St. Francis River Basins. Thus, a comprehensive examination of the forty-four biological monitoring stations currently being maintained in the State indicates that conditions are generally fair and trends are stable.

Great progress has been made in curtailing residual toxics in the environment. Some concern exists about PCBs, which are still being detected in many locations. This concern is caused, not by new sources of PCBs, but rather by the residual nature of the compound and its tendency to magnify in the environment. Chlordane, another residual compound which is being detected in fish from the Mississippi River, may prove to be a major problem. Currently, an interstate committee is being formed with Tennessee, Mississippi, Missouri, and possibly Kentucky to design a program to determine the extent of this problem.

Arkansas' most pressing water supply need is the protection of its large regional water supply lakes. A pilot study is now underway in Beaver Reservoir.

California

For complete copies of the California 305(b) Report, contact:

California State Water Resources Control Board
Division of Technical Services
Investigation/Program Development Section
Sacramento, CA 95801

Summary

Water quality conditions throughout California for the 1980 and 1981 biennial reporting period were generally good. Data summarized from Statewide stream sampling show that water quality conditions have continued to improve. Twenty of twenty-eight Priority I streams have water quality classified as good to excellent. Five streams have medium water quality and three streams are rated as poor. The Alamo, the New, and portions of the Middle Santa Ana Rivers do not meet the fishable/swimmable minimum standards established by EPA pursuant to PL 92-500. Results of toxic substances monitoring indicate that some areas have elevated concentrations of toxic pollutants in surface waters and in some coastal marine waters. Results of stream monitoring have indicated numerous short term water quality standards violations.

There are a number of localized surface water quality problems, but their solution is possible with already available best management practices. Some persistent problems such as mine drainage, surface erosion, and urban runoff do not have well defined solutions. Ground water overdraft and toxic pollutant contamination of municipal ground water supplies are problems receiving increased attention from State and local agencies.

Some of the highlighted water quality trends, problems, and accomplishments detailed in this report are summarized as follows:

- A major water resource problem facing California in the 1980s will be the balancing of water quality considerations against water delivery needs as the State's population continues to increase.
- Efforts over the last decade to correct major point source pollution and contamination problems have been very successful, although municipal wastewater treatment plants in major metropolitan areas such as Los Angeles, San Francisco, and Sacramento are not yet completed.
- Nonpoint sources of pollution are generally widespread geographically, and are difficult to identify and control. Further, they are usually the result of long-held land use practices. Typical nonpoint source problems include: ground water pumping overdraft with attendant sea-water intrusion; industrial toxic pollution; effects from agricultural waste drains, including toxic pollution; logging and roadbuilding practices; and drainage from abandoned mines.
- The 28 Priority streams assessed in this report have a combined length of nearly 4,000 stream miles and represent a cross section of water quality data reflecting approximately 80 percent of California's average annual runoff. Approximately 7 percent of these stream miles are classified as Water Quality Limited Segments (they do not meet quality standards sufficient to protect designated beneficial uses).
- A review of Water Quality Index (WQI) data indicates that the surface water quality conditions Statewide are generally improving. Most streams meet national goals. As measured by a composite WQI, the quality of surface water in California has improved from the medium to the good to excellent range during this period.
- California's Mussel Watch marine monitoring program reveals some decline in PCB levels. Mussel

Watch analyses also show evidence that chronic, low-level oil pollution may exist along the entire California coastline.

- Toxic Substances Monitoring Program activity during water year 1980-81 revealed that sample organisms from eleven sampling sites contained 28 toxicant concentrations that exceeded recommended guidelines for fish and wildlife protection. A few samples in Northern California streams have contained pollutant levels exceeding FDA guidelines for human consumption.
- Within the reporting period, several localized ground waters were found to contain high levels of industrial chemicals and pesticides. Extensive sampling, coordinated among several agencies, was designed to more closely define the sources of the contaminants, the path of ground water travel, and best corrective measures. Regional Board enforcement actions have been initiated, and cleanup and restoration have begun in several areas.

Colorado 1980

For complete copies of the 1980 Colorado 305(b) Report, contact:

Colorado Department of Health
Water Quality Control Division
4210 E. 11th Avenue
Denver, Colorado 80220

Summary

Because of its geographical location and topographical features, no significant amount of usable water flows into the State from outside its boundaries. Colorado depends on rainfall and snowmelt for all of its surface and ground water supplies.

Gross stream pollution where the water is unfit for any beneficial use is very uncommon in Colorado, except possibly in some historic metal mining districts and immediately below some natural mineral springs or seeps.

Mine drainage from inactive metal mines containing toxic metals and acidity is the most intractable water quality problem in the State. The many-faceted nature of this problem has been detailed in a report prepared by the Division for the Statewide 208 Water Quality Plan, entitled *Mining and Water Quality in the State of Colorado*(1978). Current effort in this problem area is aimed toward establishing the feasibility of rehabilitating metal mine drainages.

Natural drainage from heavily mineralized areas across the State is also a major limiting factor constraining the uses of Colorado's streams. There are many documented instances where streams have been shown to contain fish-toxic levels of heavy metals which are attributable to natural drainage.

Discharges of treated and untreated minicipal or industrial wastewater can have a significant influence on the receiving stream waters. Since point sources of pollution, for the most part, are controllable, a great deal of emphasis is placed by the Water Quality Control Division on controlling such discharges.

Colorado's discharge permit program is now fully operative, and the majority of the dischargers to State waters have been issued permits.

Major water quality impacts have been attributed to agriculture in Colorado. It is important to recognize that in general, few pollutants are actually introduced to streams by agricultural activities. The main effect of using streams for irrigation is to further concentrate water constituents or parameters already in the water. However, erosion from fields disturbed by agriculture can cause significant sedimentation in streams receiving the runoff. Most farmers use management practices that minimize erosion.

The greatest effect of agriculture upon streams in this State is the depletion of flows. Diversions can completely dry streams or leave so little water that the aquatic ecosystem is severely reduced and human recreation is impossible. Low summer flows, coupled with rising water temperatures, reduce the assimilative capacities of the streams for pollutants. Of course, municipal and industrial diversions may have the same flow-reducing effect as agriculture.

Several other important water quality impacts to streams having a more localized effect are derived from urban runoff, construction activities, and poorly executed silvicultural activities.

Connecticut

For complete copies of the Connecticut 305(b) Report, contact:

Connecticut Department of Environmental Protection
Water Compliance Unit
165 Capitol Avenue
Hartford, CT 06115

Summary

Since the passage of Connecticut's Clean Water Act in 1967 and the Federal Water Pollution Control Act Amendments of 1972, there has been a vast improvement in water quality due to an aggressive and well supported State water pollution control program. The first sources of pollution addressed were severe contamination problems such as continuous raw or poorly treated sewage discharges and industrial discharges having little or no treatment. The major thrust of the Water Quality Management program in the 1970s was to achieve consistent treatment levels for municipal and industrial wastewater based on reasonably available treatment technologies. Achieving this consistent treatment level was made possible by State and federal sewerage construction grants (approximately $303,500,000 and $473,000,000 respectively) and by the issuance of State pollution abatement orders (approximately 2,500). There have also been substantial expenditures for wastewater treatment by industry and local municipalities. As a result, there is greater recreational usage of the State's water resources, decreased health risks, improved aquatic habitats, aesthetic improvements, and generally a higher appreciation for these most important resources.

Although great progress has been made in improving the quality of the State's waters since the passage of Connecticut's Clean Water Act in 1967 and the 1972 Federal Water Pollution Control Act Amendments, attaining the dual goals of fishable-swimmable surface water quality and adequate unpolluted ground water for public consumption will require additional efforts to regulate, and in some cases eliminate, sources of pollution.

Existing Conditions

Since 1978, water quality in approximately 35 miles of rivers and streams which had previously exhibited poor water quality improved to the extent that the water quality goal was met.

Over 90% of the total miles of rivers and streams in Connecticut meet the criteria of "fishable-swimmable" water quality. Of the 963 miles of major waterways, 70% meet this goal. Water quality standards have been attained to a degree in all major river basins, as follows:

Basin	Percent of Total Stream Miles in Connecticut	Percent of Stream Miles Meeting WQ Standards
Housatonic	24	57
Thames	21	76
Connecticut	18	53
Central Coastal	13	72
Western Coastal	10	91
Farmington	9	83
Eastern Coastal	4	100
Pawcatuck	1	100

Connecticut's surface water quality problems stem primarily from combined sewer overflows, the need for municipal sewage treatment beyond secondary levels, the need for industrial waste treatment beyond BPT levels, and nonpoint source pollution. A major exception is the upper Housatonic River, where the water quality goal is not being met due to sediment contamination with PCBs which precludes eating fish from the river.

Six of Connecticut's most severely polluted rivers had an improving trend for at least one measured water quality parameter. Three other severely polluted rivers have remained the same or slightly regressed. Regression analysis also shows that the dramatic gains in water quality resulting from implementation of BPT waste treatment in the late 1970s are being maintained.

The vast majority of the State's ground water is suitable for drinking without treatment. However, there are many competing demands placed upon ground water resources for both water supply and waste disposal.

Lake water quality conditions have benefited from State management strategies and policies which prevent degradation by point source discharges. The elimination of federal funding under Section 314 of the Clean Water Act seriously reduces the ability of the State to conduct additional studies or implement recommendations for previously studied lakes. In addition to Section 314 funded activities, progress is being made in abating eutrophication of the Housatonic River impoundments (Lakes Zoar, Lillinonah, and Housatonic) by the implementation of advanced waste treatment for nutrient removal.

Delaware 1980

For complete copies of the 1980 Delaware 305(b) Report, contact:

Division of Environmental Control
Department of Natural Resources and Environmental Control
Tatnall Building, Capitol Complex
Dover, DE 19901

Summary

The State of Delaware's surface and sub-surface water resources are for the most part in good condition. Moreover, all but two segments, the Broadkill and Delaware River, are at least partially meeting the 1983 national water quality goal. However, most segments may have brief periods when critical parameters are of reduced quality. While the Broadkill River may meet the 1983 goal, the middle portion of the Delaware River will certainly require much more time to meet water quality goals set for 1983.

Since the 1978 inventory, surface waters have shown some improvement. Dissolved oxygen (DO) and fecal coliform bacteria levels have improved in most segments. The overall levels of nutrients improved in 16 of the State's 20 segments. Ten segments showed improvement in DO content. Only one segment (Leipsic River) showed a distinct deterioration of this factor. All other segments showed DO values similar to those measured in 1978 (at already acceptable levels). Only six of Delaware's streams show an indication of contamination by heavy metals, and none of these are seriously impacted on a continuous basis. The waters of Delaware Bay and adjoining ocean are of generally good to excellent quality.

A new review of the National Pollutant Discharge Elimination System files indicates that not all stream segments have experienced a decrease in pollutant loadings. However, this may be due in part to the expansion of sewer systems and the cross-basin pumping of sewage and drinking water. The Statewide total loadings of BOD_5 and total suspended solids have dropped by 67 and 59 percent, respectively, since 1975 (after cooling water flow is subtracted). Also, the total amount of wastewater flow has decreased by 15 percent since 1975.

Delaware's ground water is also in good condition. There have been no new major finds of widespread contaminated ground water. The designated surface water drinking supply streams (Christina River, White Clay, Red Clay, and the Brandywine River) are also suitable for such usage.

In summary, Delaware's streams have improved since 1978 and, with the continued and cooperative efforts of the numerous organizations and individuals involved in water quality management, this trend will likely continue.

District of Columbia

For copies of the District of Columbia 305(b) Report, contact:

D.C. Department of Environmental Services
Bureau of Air and Water Quality
5010 Overlook St. S.W.
Washington, D.C. 20032

Summary

The waters of the District of Columbia have improved considerably in the last 15 to 20 years, especially in levels of fecal coliform bacteria and dissolved oxygen. Over the past five years, improvements have been less easy to document because of wide variations in stream flow and weather conditions. This may indicate that the rate of water quality improvements has slowed relative to the large monetary expenditures of previous years. The full impact of the latest advances in wastewater treatment at the Blue Plains sewage treatment plant (STP) and reductions of combined sewer overflow discharge volumes will not be evident for several years, especially because of natural environmental fluctuations. However, careful inspection of the data, taking into consideration flow and weather conditions, does reveal improving trends between 1977 and 1981. Since the last assessment in 1980, water quality has shown improving trends based on the seven parameters evaluated in this report.

The following are some general conclusions reached in this report about water quality in the District of Columbia:

- The Potomac River has improved over the past five years, as indicated by decreased violations of fecal coliform bacteria, dissolved oxygen, and pH water quality standards, and by reduced concentrations of total Kjeldahl nitrogen and total phosphate.
- The Anacostia River, although showing improvements, still has serious problems with sediments, fecal coliform bacteria, and dissolved oxygen concentrations.
- Wetland areas are extremely limited and probably adversely affected by sedimentation and public abuse.
- Fishing in the District is improving, as indicated by the return of many species of sport fish, including bass.
- Two potential toxic problems exist in waters of the District of Columbia: lead in Rock Creek and other small tributaries, and chlorine discharges from Blue Plains STP.
- Combined sewer overflow volumes have been reduced by 66-70%. A final report on the study of further controls will be completed in the near future.
- The NPDES Program has resulted in water quality improvements; industry commitments to meet permit conditions have been promoted; and improvements in Blue Plains STP facilities and processes have occurred.
- Progress toward attaining the goal of the Clean Water Act has been made. However, improvement in the existing quality of the Potomac and other waterbodies in the District, or even simply maintenance of their current conditions, will continue to require large expenditures of funds.

Florida

For complete copies of the Florida 305(b) Report, contact:

Florida Department of Environmental Regulation
Bureau of Water Analysis
Division of Environmental Programs
2600 Blair Stone Rd.
Tallahassee, FL 32301

Summary

The primary objective of the report is to evaluate the quality of navigable waters in light of their designated uses and to assess progress toward meeting the goal of the Clean Water Act (i.e., "wherever attainable, an interim goal of water quality which provides for the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water be achieved by July 1, 1983").

In addition to the readily identifiable impacts of point sources, water quality in Florida's navigable waters is also affected by nonpoint sources such as agriculture, urban runoff, mining, silviculture, construction, and dredge/fill operations. The impacts of nonpoint sources are a significant cause of the accelerating eutrophication of many of Florida's lakes and estuaries.

Water quality in many streams or stream segments does not meet the appropriate stream standards (especially for dissolved oxygen and pH) because of natural conditions. Florida is richly endowed with many types of wetlands, and streams draining these wetlands generally have low dissolved oxygen and pH, and high color.

Sources of the data used in this report are STORET and the data from intensive surveys performed in conjunction with the development of wasteload allocations. STORET data are collected as part of the fixed station network (107 stations), miscellaneous DER stations, as well as the data from other agencies using the STORET system. Over 700 stations are used in this report to assess Florida's water quality.

In addition to analyzing the available data in terms of compliance/non-compliance with appropriate water quality standards, the State used a screening technique to make an overall assessment of water quality.

Twenty-three water quality problem areas in Florida are discussed. The sources of these problems include treated effluents from industrial processes, domestic sewage, and runoff from urban, agricultural, and mining operations.

Georgia

For complete copies of the Georgia 305(b) Report, contact:

Georgia Department of Natural Resources
Environmental Protection Division
270 Washington Street, SW
Atlanta, GA 30334

Summary

During 1980 and 1981, water quality in Georgia's streams, lakes, and estuaries was generally good.

Water quality in 95 percent of Georgia's estimated 20,000 total miles of streams was in the "good" or "excellent" range and was meeting the federal fishable/swimmable objectives. Additionally, there were other near natural streams that marginally met the fishable/swimmable objective during 1980 and 1981, but where growth and development in the future, without precaution, might obstruct progress toward the goal.

Where the Trend Monitoring Index was in the "fair" or "poor" range, problems could usually be related to municipal or industrial wastewater discharges. However, nonpoint sources of pollution such as urban area runoff can reduce the index to the "fair" or even "poor" range for limited periods of time in some areas.

Data from the State's water quality monitoring stations plus additional information from intensive surveys revealed that most of Georgia's streams met the applicable water quality criteria. Violations did occur periodically, mostly for the fecal coliform bacterial standard. During 1980 and 1981, extremely low flows in most streams resulting from severe drought caused an increase in violations, especially in the smaller streams.

Although many of the State's streams had record low flows during the period, data from most water quality monitoring stations revealed no significant changes in 1980 and 1981. A decrease in water quality was noted in the Satilla River below Waycross and in the Ochlockonee River below Moultrie and Thomasville. However, improvement was noted in the Oconee River below Milledgeville.

The major area of poorer water quality in the State continues to be the Atlanta metropolitan area. Although significant improvement has been achieved, additional efforts are needed, many of which are in progress. Additional improvement is also needed in the rivers below other population centers, especially Augusta, Macon, Valdosta, Dalton, and Rome. Each of these municipalities is in the construction grants program and is in need of additional federal funding to complete current projects.

During 1980 and 1981, construction activities resulted in the completion of 27 new publicly-owned wastewater treatment facilities and the elimination of ten inadequate facilities. There has been increased emphasis on compliance of municipal facilities with their discharge permits over this two-year period. Major permit violations are usually associated with inadequate plant budgets, poor operator training, hydraulic overloading of facilities, and inadequate solids handling capabilities. During 1980 and 1981, 24 consent orders or administrative orders were issued to municipalities for failure to comply with their discharge permit limitations.

During 1980 and 1981, extensive efforts were made to address nonpoint sources of pollution. A series of task force reports completed in 1978-1979 addressed the seven primary areas of concern (agriculture, forestry, mining, construction, hydrologic modification, salt water intrusion, and residual waste). Of greatest concern are potential problems resulting from agricultural, forestry, and urban runoff. Twenty-one streams in five physiographic regions are being investigated to determine the magnitude of their nonpoint source problems. The stream studies will continue for three years; once complete, a report will be issued which will guide the Division in future actions concerning nonpoint source water pollution abatement.

Guam

For complete copies of the Guam 305(b) Report, contact:

Guam Environmental Protection Agency
Box 2999
Agana, Guam 96910

Summary

Water quality data have now been collected systematically on Guam for four years. Analysis of the data indicates that surface water quality, both marine and fresh, is generally high, and that most areas generally meet Guam water quality standards.

The water quality of Guam's rivers generally meets the applicable standards, with some exceptions. During 1978/79, almost all rivers exceeded the established standard for phosphorus. Since then there have been only two reported phosphorus exceedences, in the upstream areas of the Geus and Ugum Rivers in 1980. The dissolved oxygen level at the downstream station on the Fonte River is consistently lower than the standard, although the level has gradually increased. The Fonte runs through a highly urbanized area, which undoubtedly accounts for the decrease in dissolved oxygen. All of Guam's rivers, whether they flow through rural or urban areas, contain coliform contamination.

In general, for both marine and river waters, no beneficial uses are being impaired due to water pollution. However, fishing and shellfishing in waters contaminated with fecal coliform bacteria may lead to health problems. The Guam Environmental Protection Agency has an active program of notifying the public of potential health threats as well as attempting to eliminate sources of contamination.

In general, the quality of Guam's drinking water has improved during the past three years. The number of times the public has had to be notified of drinking water standards violations has decreased sharply, from 26 times in 1979 to only 5 times in 1981.

There are 17 major wetlands on Guam, as identified by the U.S. Army Corps of Engineers. Most of these show some evidence of dredge and fill activities, generally associated with road construction. Several wetlands in southern Guam are used for agricultural purposes. Agana Swamp is under heavy development pressure since it is located adjacent to Guam's major commercial and governmental center.

Development in wetlands and flood hazard areas is regulated. In addition, since most large development projects on Guam receive at least partial federal funding, federal regulations on development in wetlands also apply.

Hawaii

For complete copies of the Hawaii 305(b) Report, contact:

Hawaii Department of Health
Environmental Protection and Health Services Division
P.O. Box 3378
Honolulu, HI 96801

Summary

The Hawaii 305(b) report describes the water quality of coastal areas based on the presence of significant point or nonpoint sources of pollution. A group of 15 water bodies identified as water quality priority waters are covered in the report. Included in the assessment of water quality in priority waters are the various factors contributing to the problems of water pollution, as well as the key parameters exceeding the State's standards.

Hawaii's water quality problems are related to both man-induced activities and natural factors; the extent and magnitude of these sources of pollution are described in this report. Improvement in sewage treatment and abatement of raw sewage discharge have shown effects on water quality. The rapid improvement in water quality since removal of point sources is included in the discussion of certain priority waters.

The fifteen waterbodies identified as priority waters in Hawaii are:

Kahana Bay
Kaneohe Bay
Pearl Harbor
Mamala Bay (Honolulu Harbor, Kewalo Basin, Keehi Lagoon, and Ala Wai Canal)
Waialua-Kaiaka Bay
Nawiliwili Bay
Hanapepe Bay
Waimea Bay
Hilo Bay
Kahului Bay
South Molokai

The concept of water quality segments for mainland river basins is not applicable to Hawaii or the Pacific Islands. Because of Hawaii's unique insular environment, environmental problems and concerns are different than those experienced on the mainland.

The Hawaii water quality standards are based on a variety of factors unique to actual ecosystems in the State. The standards recognize the variety of water types and the natural variability within each system. The standards focus upon water quality as it affects ecosystem structure and dynamics.

Although the existing water quality in priority waters supports beneficial uses in general, attainment of the highest level of desired use is necessarily compromised by conflicting designated or existing uses.

The improvement of sewage treatment and abatement or removal of municipal waste sources have markedly enhanced Hawaii's water quality (including recovery of coral reef systems) and have significantly reduced public health hazards from swimming beaches.

Nonpoint sources of pollution associated with natural and man-related activities are the major contributors to water quality deterioration.

Idaho

For complete copies of the Idaho 305(b) Report, contact:

Idaho Department of Health and Welfare
Statehouse
Boise, ID 83720

Summary

Water quality conditions in Idaho vary geographically. The central and northern regions of the State are characterized by particularly high quality waters. Many areas within these regions are protected through wilderness, recreation area, or wild and scenic river designations. Geographic areas which are experiencing degradation are the southeast, the southwest, and the Palouse country of the Panhandle region.

Nonpoint source activities—specifically dryland and irrigated agriculture—account for the majority of pollution problems in the State. The extent of water quality impacts due to such activities can be illustrated by changes observed in the Snake River as it flows across the State. Water quality is good as the Snake flows into Idaho from Wyoming. As it flows west, quality progressively declines, reaching its poorest levels near the Idaho-Oregon border. The only measured "recovery" in water quality along the length of the Snake occurs below major impoundments due to settling of sediments and associated pollutants, and below the aquifer discharge of Thousand Springs at Hagerman. Although Snake River water quality is also affected by a combination of point and nonpoint sources on tributary streams, the vast amount of land in agricultural production adjacent to the main stem of the Snake is also a substantial source of water quality degradation.

The extent of point and nonpoint source pollution problems varies within each major drainage of the State. The nature and magnitude of water quality problems by basin are described in the complete report. The primary tool used in evaluating Idaho's water quality conditions is the water quality index developed by EPA Region 10. The basin discussions address water quality status, trends, the magnitude of point source versus nonpoint source impacts, and the extent of those impacts on the beneficial uses of the waters.

Illinois

For complete copies of the Illinois 305(b) Report, contact:

Illinois Environmental Protection Agency
Division of Water Pollution Control
2200 Churchill Road
Springfield, IL 62706

Summary

Analysis of ambient and lake network data for 1979 through 1981 does not indicate any significant overall change in Illinois' water quality. Approximately 20 percent of the water monitoring stations continue to exhibit severe pollution problems as determined by a water quality index. There is also no overall change in lake quality.

Of Illinois' 14 major river basins, the Big Muddy Basin exhibits the best overall stream quality based on the percent of stations with minimum or no water quality problems as determined by use of a water quality index. The Des Plaines Basin has the most severe water quality problems. Glacial lakes show the best overall trophic conditions, whereas artificial lakes (impoundments) in both the north and south display better trophic conditions than artificial lakes in south central Illinois.

Whereas localized water quality improvements have been documented in Illinois, the apparent lack of recent overall water quality improvement is not surprising. Agricultural impacts upon water quality are a significant factor, and programs to manage agricultural and urban runoff, as well as other types of nonpoint source pollution, are just beginning. Moreover, a significant number of municipal wastewater treatment projects for which design or construction has recently started remain to be completed. For example, 486 construction grants were awarded in Illinois from 1974 through May 1981, and approximately 50 percent or 224 projects are still under construction, in the bidding stage leading to award of construction, or completing design work. Given funding commensurate with needs, an overall improvement due to current pollution control efforts should be observed Statewide in a few more years.

Violation rates for certain selected parameters during 1978-1981 are summarized below.

ph- Only the Ohio Basin displayed significant pH violation rates; these ranged from 16 to 33%. The Kaskaskia Basin had 7% pH violation rates in 1978; all other basins had less than 4% violations.

Ammonia- Most basins were consistently below the 20% violation rate, except the Des Plaines Basin. There was an apparent downward tendency in the number of ammonia violations in the Des Plaines Basin from 1978-1981.

Dissolved Oxygen- Many basins had violation rates below 10%, and nearly all were below 20%. The highest percentage violations were found in the Big Muddy and Mississippi South Basin, with 24% and 23% respectively.

Fecal Coliform- Fecal coliform violations ranged between 40 and 80%. The Des Plaines and Mississippi South Basins had the highest rates, but were showing general downward trends. The Ohio and Big Muddy Basins had the lowest violation rates.

Iron- Apparent slight downward trends were seen in many basins. The violation rate was generally between 40 and 80%, which was not surprising because Illinois waters are naturally high in iron. The Ohio and Mississippi South Basins had the highest percent of violations.

The Ohio Basin also had some violations of cadmium, fluoride, and zinc which were not present in the rest of the basins. Mining activities in the southern part of the State may contribute to higher violation rates for several parameters, including pH, sulfate, and manganese.

The greatest percentage of violations were of fecal coliform and iron standards; some apparent downward trends were seen in some basins.

All available fish tissue data from 1980 and 1981 have been evaluated for excursions above U.S. Food and Drug Administration (FDA) action levels for contaminants in fish. The only excursions other than dieldrin and chlordane were two DDT excursions in Lake Michigan trout. Statewide excursions for dieldrin and chlordane were 2 percent and 18 percent of samples, respectively. A notable number of chlordane excursions (over 30 percent) appear in lake fish samples from the Sangamon Basin and stream fish samples from the Wabash Basin.

Lake Michigan is monitored under the terms of a cooperative agreement between the Illinois Environmental Protection Agency and the city of Chicago. The bacteriological and chemical data collected during 1980 and 1981, when compared to data of the previous 10 years, illustrate an overall improvement in water quality for the southwestern portion of the lake.

Indiana

For complete copies of the Indiana 305(b) Report, contact:

Planning Section
Division of Water Pollution Control
Indiana State Board of Health
1330 West Michigan Street
Indianapolis, IN 46206

Summary

This report assesses water quality by drainage basin. Data from each Fixed Water Quality Monitoring Station along the main stem of primary streams were compiled to demonstrate the aggregate improvement or degradation of each stream.

The following is a general summary of water quality by basin.

Lake Michigan Basin

Generally, the water quality of Lake Michigan is in compliance with applicable water quality standards. Most inland rivers and streams support designated uses, but in some instances, such as within the Grand Calumet River, the influx of toxic waste material significantly reduces the stream's capacity to attain acceptable water quality.

Maumee River Basin

Each major river within the Maumee Basin complies with State water quality standards for fish and aquatic life with respect to dissolved oxygen. Some other parameters may have concentrations detrimental to aquatic life. High concentrations of copper, cyanide, and mercury have in the past been limiting factors within this area. Recent improvement has been demonstrated. In at least two streams, partial-body contact recreation criteria are met. Standards for whole-body contact recreation are not always met in the St. Joseph River.

Wabash River Basin

The water quality of the Wabash River can generally be described as meeting the State's water quality standards. Dissolved oxygen concentrations are high enough to maintain a well-balanced fish community in most areas of the waterway. Urban discharges within the upper Basin areas sometimes create slight downstream dissolved oxygen sags. The impact of this pollution is not severe enough to inhibit stream recovery. The bacterial quality improves downstream.

Tributary streams generally comply with water quality standards. The most severely impacted stream within the Wabash River Basin is Wildcat Creek. As a result of discharges from the City of Kokomo, Wildcat Creek shows increases in concentrations of some toxic parameters. Completion of the City's upgraded wastewater collection system should result in extensive water quality improvement in the stream.

Kankakee River Basin

The water quality of the Kankakee River is good. The river is an excellent habitat for wildlife, fish, and other aquatic life and is a superior recreational resource. In the past, the only water quality limiting factor within this stream has been an unidentified source of mercury near its headwaters. The extent of this concentration was not severe enough to cause toxic problems. Data for 1979 and 1980 do not indicate that a mercury problem still exists.

Whitewater River Basin

Both branches of the Whitewater River support a diversity of fish and other aquatic life. Dissolved oxygen concentrations fell below minimum levels only once in the West Fork of the Whitewater River from 1974 to 1980. No chemical constituent concentrations were recorded that were toxic to fish and aquatic life. The bacterial quality is better in the East Fork than in the West Fork. The West Fork of the Whitewater River does not regularly comply with the bacteriological standards for recreational waters.

East Fork White River Basin

Data since 1974 indicate that the water quality of the East Fork White River continues to improve. Sufficient dissolved oxygen is present to support a diverse aquatic community. Several factors create localized pollution problems, but these local problems are being resolved.

West Fork White River Basin

The general water quality of the West Fork White River is good except for certain reaches downstream of the metropolitan areas of Muncie, Anderson, and Indianapolis. Discharges at Indianapolis affect water quality to some extent as far downstream as Spencer. A notable decrease in dissolved oxygen concentrations and a corresponding increase of coliform bacteria occur downstream from each of these municipalities. Concentrations of phenols and mercury still indicate water quality problems in some areas of the West Fork of White River.

St. Joseph River Basin

The St. Joseph River has been designated for two different instream uses: aquatic life and recreation. Dissolved oxygen concentrations are adequate to maintain fish and aquatic life. The once-high cyanide levels have been reduced during this survey period. The St. Joseph River does have problems maintaining desirable bacterial levels for full recreational benefits from April through October, inclusive. During the remaining months, when standards for partial-body contact recreation apply, bacterial concentrations demonstrate better instream compliance.

The major tributary stream, the Elkhart River, also maintains sufficient water quality for fish and aquatic life. As in the St. Joseph River, coliform bacteria concentrations periodically rise above State limitations.

Iowa

For complete copies of the Iowa 305(b) Report*, contact:

Iowa Department of Environmental Quality
Henry A. Wallace Building
Des Moines, IA 50319

Summary

The status of water quality in 1979 and 1980 was determined by evaluating water quality impacts and violations of Iowa's water quality standards. When possible, 1979 and 1980 data were added to existing long term water quality information to determine trends. Sources of pollution and pollution abatement activities were considered in attempting to correlate water quality with factors influencing it. Fish kills, spills, and accidental discharges that threatened water quality were also documented.

Statewide, the water quality of 74 streams, 107 lakes, and four major reservoirs was evaluated. Thirty-seven of the rivers were found to have water quality problems at one or more locations. Forty-nine problem areas were identified. The probable cause of the problem was identified at 25 locations. Point source discharges are thought to be responsible for water quality problems at 22 locations. Fifteen of these point sources have received construction grants funds to improve their wastewater treatment facilities. Three other point sources are undergoing remedial action of some kind. Forty-two streams and four reservoirs were identified that had no water quality problems and/or showed improvements at one or more locations. Of the 10,651 observations made at stream and reservoir locations, only 2.4%, or 255 values, violated applicable Iowa Water Quality Standards to protect the stream's beneficial use.

Trend analysis was performed at 41 locations. At 16 locations, concentrations of both BOD and ammonia remained stable for five or more years. Increasing trends in ammonia concentrations were observed at three locations and decreasing trends were found at eight locations. Increasing trends in BOD concentrations were found at two locations and decreasing levels of BOD were observed at 15 locations. On 13 of 14 streams where biological data were collected, the results showed healthy diversities of aquatic life. Evaluations of discharge monitoring data showed that 68 wastewater treatment facilities were consistently in violation of their permit limitations and thus posed a substantial threat to water quality. Twenty-four fish kills were investigated and 38 spills or accidents threatened surface waters during the reporting period.

Lake monitoring showed that all studied lakes were eutrophic. Forty-two percent exhibited thermal stratification resulting in low dissolved oxygen levels at lake bottom. Twenty percent of the lakes had one or more surface locations that exceeded the pH limits identified in the water quality standards.

Agricultural cropland is a major source of pollutants to Iowa's surface waters. Sediments, pesticides, and nutrients all enter surface water as diffuse sources during runoff periods. The contribution of sediments causes two types of problems: pollution caused by the particulate matter itself, and pollution resulting from contaminants adsorbed onto the sediment particles. Soil-attached pollutants include phosphorus, heavy metals, and many pesticides. Other pollutants are transported dissolved in the runoff. Nitrogen and some pesticides are delivered to the surface water in the soluble state.

The quality of ground water in Iowa's surface deposits is generally acceptable. While a few problems are highly localized, other problems such as nitrate levels and loss of artesian pressure have been identified over large geographic areas of the State.

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*Available from the Iowa Department of Environmental Quality for $20.50 or from the National Technical Information Service (PB83I-00214) for $19.00

Kansas

For complete copies of the Kansas 305(b) Report, contact:

Kansas Department of Health and Environment
Division of Environment
Forbes Field
Topeka, KS 66620

Summary

Major rivers in Kansas display the following characteristics: turbidity, moderate mineralization, good buffering, good oxygen characteristics, low organic loading, high nutrient levels, and high bacterial levels. Water quality trends since 1967 for nine major Kansas rivers indicate that 68 key parametric averages have shown water quality improvement or no significant change, and 22 key parametric averages have shown water quality deterioration. Water quality in Kansas streams in the last two decades has been primarily influenced by nonpoint sources, point source contributions having had their greatest impact during the period of the 1930s through the 1950s. At present, instream quality is determined almost entirely by flow regime. During low flow periods, the most significant quality influence is mineral inflow from natural sources. During high flow periods, most Kansas surface waters display their poorest quality, with significant increases in BOD, nutrients, fecal coliform bacteria, and turbidity from nonpoint source contributions.

Monitoring programs for toxic substances in Kansas have accelerated in recent years due to increased concern over these substances in our waters. Except for iron and manganese which are common in major streams, no significant concentrations of heavy metals have been found in major Kansas streams or lakes. Iron, zinc, copper, and lead are found to varying degrees in small tributary southeastern Kansas streams which drain the coal and ore mining areas. No significant concentrations occur in mainstem streams. No significant concentrations of pesticides have been found in Kansas streams at standard detection levels during normal surveillance, nor during special studies of irrigation return flow.

Biological quality in Kansas is monitored through two programs: the stream biological network with 47 sampling stations, and the lake network at 65 major lakes. Accounts of the organisms collected at biological sampling network stations and river basin survey stations over the five years of program operation indicate that virtually all streams and rivers in Kansas support adequate populations of stream-dwelling organisms. Limiting factors in streams are usually unsuitable substrate or velocity patterns.

Water quality problems associated with advanced eutrophication are not common in Kansas lakes. Excessive growths of aquatic macrophytes are restricted to a few small lakes; algae blooms and oxygen depletion, when they occur, are ephemeral conditions lasting only several days in most cases. The major water quality characteristic of Kansas lakes appears to be generally high levels of inorganic turbidity due to periodic high suspended silt loads.

Achievement of 1983 Water Quality Goals

It is currently felt that the 1983 national water quality goals of bio-support and recreation in and on the water cannot be fully achieved in all Kansas waters. However, impounded waters, lakes, and reservoirs which have sufficiently long flow-through time to allow sedimentation of suspended solids and natural biological activity are capable of full achievement of the goals. All Class A waters in the State are currently meeting full bio-support and body contact recreation requirements.

By 1983, all streams and rivers in the State should be marginally suitable, from a quality standpoint, for body contact requirements. Bacterial levels should be low during low streamflow periods, but it is anticipated that runoff will cause body contact standards to be exceeded 30 to 60 percent of the time. Beyond considerations of water quality, many Kansas streams generally are not suitable for body contact recreation because of wide, shallow channel geometry and hazardous flow patterns. Because of the above factors, the attainable 1983 water quality goals for streams are currently interpreted as bio-support and secondary contact recreation. Sixty and 56 segments, respectively, are currently meeting these goals, and all 62 segments are expected to meet the goals by 1983.

Kentucky

For complete copies of the Kentucky 305(b) Report, contact:

Kentucky Department for Environmental Protection
Division of Water
18 Reilly Road
Fort Boone Plaza
Frankfort, KY 40601

Summary

The primary activities affecting water quality in Kentucky are surface coal mining, oil and gas operations, agriculture, and domestic waste discharges.

The parameters that violate standards most frequently are fecal coliform bacteria, iron, manganese, and lead. Other parameters that show occasional violations are mercury, chromium, and cadmium. These violations occur randomly throughout the State with no discernible trends. Chronic pH violations are associated with streams affected by acid mine drainage, most notably in the Tradewater River and Green River basins. The Green River basin has the greatest number of miles of streams affected by acid mine drainage (271 miles), while the Tradewater River basin has the greatest percentage affected (79%). Data on organic chemicals in the Commonwealth's waters are very limited at this time.

Fish kills are reported by the Kentucky Department of Fish and Wildlife Resources. During the 1980-81 reporting period, 50 fish kills affecting a total of 127 stream miles were investigated.

Biological integrity was monitored at seven stations in four river basins. Conditions are reported as good at two stations, fair at three stations, and poor at two stations. The ratings are based on periphyton, macroinvertebrate, and fish community structure; stream physical habitat conditions; and water quality. Additional information is reported on fish tissue levels of toxic materials. Four stations had levels of chlordane in fish tissue which exceeded the FDA action level for this pesticide.

Under Section 314 of the Clean Water Act, a lake classification study has been conducted to assess the general condition of lakes in the State. Forty-five lakes have been classified to date. Of the 353,353 total surface acres presently classified, 74,204 acres are eutrophic, 233,213 acres are mesotrophic, and 45,936 are oligotrophic. There is documentation of impaired uses in ten lakes. Symptoms of eutrophication include excessive algal blooms, extreme oxygen depletion, excessive aquatic weed growth, turbid water, elevated iron and manganese levels, and taste and odor problems.

The severity of generalized impacts on wetlands and the extent of wetland loss is unknown. The major threat to Kentucky's wetlands appears to be their destruction due to competing land use activities and poor land management practices.

While ground water does not provide a large portion of the total water withdrawn in the State, it is an extremely important local and regional resource because it is most often used in areas where surface supplies are not physically or economically available. Approximately one-third of Kentucky's rural population still relies on private wells for domestic or household supply.

A number of earlier studies have pointed out existing ground water quality problems in the Commonwealth. The failure of on-site wastewater disposal systems (especially septic tanks and tile fields) probably represents the major source of ground water quality degradation. Other known causes of ground water contamination include waste landfills, surface disposal lagoons, oil and gas drilling and reinjection, diminished aquifer recharge, and nonpoint source pollution.

In 1981, the Division of Water initiated a comprehensive Statewide stream use classification and regulatory designation program. Where current criteria are found to be inappropriate, site-specific criteria will be recommended for approval by the State, EPA, and the public through the State's public hearing process. This effort will contribute to the mandatory triennial review and revision of the State's water quality standards, and will provide a basis for future permitting, compliance assurance, and enforcement decisions. The ultimate product will be the promulgation of surface water use designations and associated criteria for the entire State.

Louisiana

For complete copies of the Louisiana 305(b) Report, contact:

Louisiana Department of Natural Resources
Division of Water Pollution Control
P.O. Box 44066
Baton Rouge, LA 70804

Summary

This sixth 305(b) report on water quality will serve as a continuing review process to monitor, evaluate, and improve where possible the current water quality conditions of Louisiana's waters.

Information used in this report also represents intensive survey efforts and water quality reports prepared by or for the staff. A water quality index is utilized which provides a means of measuring and comparing water quality status throughout the State with respect to fishable/swimmable federal water quality goals.

General Conditions

Ninety-two of Louisiana's 113 stream segments are effluent limited and the remaining 21 segments are water quality limited. Eighteen segments within the State are in the severely polluted category and do not meet federal water quality goals.

Louisiana's water supplies—both ground water and surface water—are among the most bountiful in the Nation, but localized problems exist with salt water instrusion, residual salt accumulation, petrochemical contamination, and other industrial and human wastes contamination. Many problems that arise outside the boundaries of the State are compounded by the large volumes of water that flow to the Gulf of Mexico. Water tables tend to be shallow and aquifers are numerous. The Louisiana Department of Public Works maintains information on producing water wells.

Oxbow lakes, small freshwater lakes, coastal lakes, and impoundments are common features within the State of Louisiana. Generally these waters are moderately hard and highly productive. Cultural eutrophication of these waters is a serious problem affecting the biota; the major nutrient additions come from runoff and municipal wastes.

One area of concern in Louisiana is toxic pollution caused by agricultural activities. Pesticide pollution is one of the more serious problems in agricultural areas of the State. Persistent substances such as toxaphene, DDT, dieldrin, chlordane, endrin, and lindane continue to be both health and pollution problems near many agricultural and urban centers.

Maine

For complete copies of the Maine 305(b) Report, contact:

Department of Environmental Protection
Bureau of Water Quality Control
Division of Environmental Evaluation and Lake Studies
State House
Augusta, ME 04330

Summary

Over the past ten years, with assistance from federal and local governments and with the active concern of its citizenry, the State of Maine has succeeded in reversing a long period of decline in the quality of its waters.

Maine's waters are now much cleaner than they were just a few years ago. Some of the State's most polluted lakes have shown marked improvement. Atlantic salmon and other fish have returned to several Maine rivers. People are beginning to use many previously polluted streams and rivers for swimming, fishing, and canoeing.

Despite these improvements, a great deal more work remains to be done not only to make further progress, but also to maintain the gains made thus far. As the more severe municipal and industrial pollution sources have been abated, other previously ignored types of pollution have become more prominent. Nonpoint sources continue to degrade the quality of many of Maine's waters. Acid rain and hazardous wastes, practically unknown ten years ago, menace Maine's surface and ground waters. These "newer" forms of pollution are more insidious in their effect and are more difficult to treat than the industrial and municipal wastewaters by which they had previously been overshadowed.

Existing Conditions

The water quality of Maine's rivers and streams has continued to improve over the past two years, although not at the dramatic rate that prevailed over the preceding fifteen years. The reason for the apparent slower rate of improvement is two fold. First, the major municipal and industrial discharges are receiving the equivalent of secondary treatment and thus most of the major pollution problems have been abated. Second, the recent reductions in the availability of federal construction grant program funds have slowed the rate at which the remaining municipal treatment needs can be met.

The water quality problem areas that remain are, for the most part, segments that are affected by combined sewer overflows from the State's older urban areas and by agricultural runoff and other nonpoint source pollution. There also exist several water quality limited segments that are receiving discharge loadings which, even after receiving treatment equivalent to the technology-based standards specified in the Clean Water Act, exceed the segments' capacity to assimilate the waste. Wasteload allocation studies are being performed for these rivers on a priority basis.

In addition, the following issues are also of current concern in Maine: acid rain in lakes and streams; hydropower development; the effects of hazardous wastes on ground water; lake eutrophication; and protection of high quality waters.

The percentage of the State's river and stream miles that are currently meeting the 1983 goal of swimmable-fishable water varies depending upon the estimate of river and stream miles that is used. Previous Maine 305(b) Water Quality Status Reports have used a figure of 3,080 miles of major rivers and streams; recent information from EPA's River Reach File indicates that there are approximately 8,600 miles of major rivers and streams in the State; and the Maine Department of Inland Fisheries and Wildlife estimates that there are approximately 32,000 miles of permanent rivers and streams in the State. These three estimates of river and stream miles yield estimates of 75, 90, and 97, respectively, for the approximate percentage of waters meeting the 1983 goal.

There are seven water quality limited segments in five of Maine's eight major river basin planning areas. These water quality segments include the main stem of the Sebasticook River from the Irving Tanning Company outfall to the confluence with the Kennebec River, and the East Branch of the Sebasticook River from Dexter Village to the confluence with the Sebasticook main stem, both in the Kennebec Basin; the Presumpscot River from Westbrook to the confluence with the Atlantic Ocean in the Presumpscot-Cumberland Basin; the St. Croix River from the Georgia Pacific Company outfall to head of tide in Calais in the St. Croix Basin; the Aroostook River from the confluence of Presque Isle Stream to the Canadian border, in the St. John Basin; and the Mousam River from the Sanford Sewage District to head of tide and Goosefare Brook from the Maremont Company outfall in Saco to head of tide, both in the Southern Maine Basin.

Some river and stream segments in Maine do not meet the 1983 goal and are not expected to do so, in large part because of combined sewer overflows and nonpoint sources. These failures to meet the goal are temporary in nature, usually associated with storm events resulting in levels of fecal coliform bacteria that exceed the standard for swimming. Because of the extraordinarily high cost of correcting these problems, the temporary nature of the impact they have, and their low priority relative to other water quality problems in the State, these problems will probably not be addressed in the near future.

Maryland

For complete copies of the Maryland 305(b) Report, contact:

Maryland Department of Health and Mental Hygiene
Office of Environmental Programs
201 West Preston Street
Baltimore, MD 21201

Summary

Overall, Maryland's waters are judged to be generally of good quality. Water quality has generally remained stable, even though many problems still exist. Maryland identifies its foremost problem to be the increasing accumulation of nutrients in tidal waters and impoundments. Additional problems include pockets of dissolved oxygen depletion still remaining in site-specific, historically documented problem areas (most now targeted for correction), and extremely difficult-to-solve, long term abandoned acid mine drainage conditions in the far western portion of the State. Of lesser severity, but still deserving continuing attention, are elevated bacteriological densities that are the result of local conditions found throughout the entire State. The continuing severe diminuation of highly prized anadromous fish species and the almost total loss of submerged aquatic vegetation are other problems which have yet to be solved.

However, some accomplishments have been made. Almost all the point source discharges have achieved, or will soon achieve, levels of treatment determined to assure acceptable water quality. Many of these facilities, like Back River, Aberdeen, Sod Run, Blue Plains, and the Northeast Plant, have incorporated into their treatment processes advanced levels of treatment. Many facilities will stabilize the oxygen demanding material prior to discharge and a number will be removing phosphorus, a key stimulator of algal growth. Some evidence of these improvements can already be seen. Already the tidal Potomac—described as a cesspool of filth in the 1950s—is showing dramatic improvement. Other nutrient enriched areas like the Upper Chesapeake Bay and the Patuxent River have strategies in place to address this problem and are expected to respond in similar fashion.

A great deal has been done in Maryland to assess and control the impacts of point source discharges. The more difficult and subtle area of nonpoint source assessment and control must now be confronted in the 1980s. Nutrient (nitrogen and phosphorus) enrichment and suspended sediment generation are two of the more important areas that will have to be addressed.

The biological integrity of Maryland's waters was evaluated. The evaluation of the benthos populations (population and diversity of bottom dwelling organisms) concluded that Maryland's waters are maintaining generally good biological quality.

As indicated in the table below, less than 10 percent of the waters of the State are violating water quality standards. Of this 10 percent, approximately 3 percent is due to long term mine drainage and approximately 2 percent is related to shellfish water closures where no harvestable bottoms exist.

Summary Description of Sub-Basins

Description	Total Main Stem Miles	Miles Now Generally Meeting State WQ Standards
Chesapeake Bay Area	118	118
Ocean/Coastal Basin	81	75
Pocomoke River Basin	162	115
Nanticoke/Wicomico	156	138
Choptank River Basin	123	111
Chester River Basin	162	124
Elk River Basin	137	136
Lower Susquehanna	83	82
Bush River Basin	69	69
Gunpowder River Basin	102	102
Patapsco River Basin	132	112
West Chesapeake Basin	97	75
Patuxent River Basin	187	175
Lower Potomac Basin	249	242
Washington Metro Area	165	165
Middle Potomac Basin	136	135.5
Upper Potomac Basin	271	271
North Branch Potomac	160	97
Youghiogheny Basin	94	82.5
TOTALS	2,684	2,425

Although there are numerous shellfish closures throughout the tidal areas of the State, the general trend since 1972 has been toward a sharp reduction of closed harvesting waters. In recent years, this trend has been leveling off; between 5 and 6 percent of shellfish waters are generally closed.

The reduction of closed harvesting areas since 1972 is generally attributed to a management strategy which identifies and eliminates potential pollution sources during the design and construction phases of abatement, to improvements in and expansion of existing waste water treatment facilities under the Clean Water Act, and to improvement in Maryland's Shellfish Sanitation Program.

Massachusetts

For complete copies of the Massachusetts 305(b) Report, contact:

Commonwealth of Massachusetts
Department of Environmental Quality Engineering
Division of Water Pollution Control
Westborough, MA

Summary

The quality of the surface water of the Commonwealth of Massachusetts continues to improve significantly as 48 percent of the total river miles assessed in this 1982 report met their designated water quality classification. For comparison, the 1977 Section 305(b) Report indicated that 32 percent of the river miles assessed met their designated classification and only 26 percent exhibited Class B (fishable/swimmable) water quality. These figures demonstrate the substantial improvements which have occurred within the past five years and amplify the benefits gained from the extensive water pollution control programs of the Commonwealth.

The evaluation of the lakes and ponds of the Commonwealth has accelerated within the past few years. To date, 350 lakes and ponds have been sampled and subsequently classified according to their trophic state. A diagnostic/feasibility program has been implemented which has culminated in several restoration projects.

Over the past decade, approximately one billion dollars have been expended through the construction grants process for the design and construction of wastewater collection and treatment systems. The funding for these projects has been provided by the United States Environmental Protection Agency, the Commonwealth of Massachusetts, and individual cities and towns. This program is responsible for major water quality improvements in many waters of the Commonwealth including the Merrimack, Chicopee, Westfield, Connecticut, Millers, and Charles Rivers. This improvement is expected to continue in the upcoming decade as the sources of water pollution are increasingly brought under control.

The future water quality programs of the Department of Environmental Quality Engineering will focus upon improving water quality conditions in critical areas and will include: construction of water pollution abatement projects within the limitation of available funding; implementation of the most practical control on combined sewer overflows; evaluation of nutrient removal requirements necessary to retard eutrophication; and assessment of the effects of toxic substances upon ambient water quality and indigenous biota.

As the water pollution abatement program continues to improve the surface waters of Massachusetts, more attention will be given to the evaluation of both the quantity and quality of ground water throughout the Commonwealth. Recent discoveries of contaminated public water supply wells in a number of muncipalities in Massachusetts has clearly shown that aquifers are not immune from pollution problems such as contamination by industrial wastes and salt water intrusion. A high priority of the Department in the future is to protect the quality of ground water.

Michigan 1981

For complete copies of the 1981 Michigan 305(b) Report, contact:

Michigan Department of Natural Resources
Bureau of Environmental Protection
Environmental Services Division
Stevens T. Mason Bldg.
Lansing, MI 48926

Summary

Overall, water quality in Michigan is good. However, there are water quality problems which need attention.

The control of toxic and hazardous materials is clearly the most pressing issue in environmental protection today. Health advisories concerning the consumption of fish from certain waters in Michigan remain in effect. During 1980, Michigan implemented the Hazardous Waste Management Act, for which administrative rules were adopted in April of 1981. This law represents a significant step towards a "cradle-to-grave" toxic and hazardous waste management program.

Fish consumption warnings remain in effect for all the Great Lakes waters within Michigan's political boundaries, Lake St. Clair, the St. Clair River, and the Detroit River. Fish consumption bans remain in effect on portions or all of seven streams in the State: the South Branch of the Shiawassee River; Portage Creek; the Kalamazoo River; the Chippewa River; the Pine River; the Tittabawassee River; and the Saginaw River.

In December of 1979, the DNR identified sites where there is known, suspected, or potential ground water contamination. With help from State agencies and interested citizen groups, the DNR is developing ways to approach the investigation and cleanup of these ground waters. In 1980, ground water rules were adopted to allow more consistent and complete regulation of Michigan's ground water quality. In 1980, federal "Superfund" legislation was also enacted to provide money for identifying, investigating, and cleaning up contaminated sites.

Eutrophication of the Great Lakes has been a water quality problem for over two decades. Significant program efforts have resulted in a decrease in the amount of nutrients discharged to surface waters. As a result, significant water quality improvements have been documented in both Saginaw Bay and Lake Erie.

Significant destruction of wetlands has occurred in Michigan. In December of 1979, Michigan signed into law the Wetlands Protection Act. This Act provides for the preservation, management, protection, and use of wetlands; requires permits to alter some wetlands; and prescribes remedies and penalties.

Precipitation in the Great Lakes Basin has become more acidic in the past 30 years, largely as a result of fossil fuel combustion. To date, no adverse effects of acid precipitation have been found in Michigan's surface waters.

Minnesota

For complete copies of the Minnesota 305(b) Report, contact:

Division of Water Quality
Minnesota Pollution Control Agency
1935 West Country Rd. B-2
Roseville, MN 55113

Summary

During water years 1980-81, the overall quality of water in Minnesota was good and had improved over past years. The quality ranged from excellent in the Lake Superior Basin to somewhat impaired in the Minnesota River Basin, where high nutrient, suspended solids, and fecal coliform levels interfered with achievement of the fishable-swimmable goal of the Clean Water Act.

Field evaluations were performed on 400 waterways, and 208 of these waterways were determined to be of limited resource value, i.e., can never be fishable-swimmable. No acute or consistently chronic levels of toxic conditions were recorded at any of the 71 primary monitoring stations throughout the State. All of these selected, monitored waters were considered fishable in 1980-81 compared with 89% of the stations in 1975, 88% in 76-77, and 91% in 1978-79. Approximately half of the stations, 55%, violated the fecal coliform standard 10% or more of the time. This too was an improvement from preceding years where 77% in 1977 and 70% in 78-79 were in violation. Rivers with stations where the probability of fecal coliform standard violations are so likely that swimming is not advisable include: Blue Earth River, Cedar River, Twin Cities Metropolitan Mississippi River, St. Louis Bay, Whitewater River, Root River, Red Lake River, Shellrock River, and Straight River.

Intensive investigations of water quality were conducted at 35 sites to determine appropriate effluent limits for dischargers. Violations of water quality standards for ammonia, dissolved oxygen, pH and/or fecal coliforms were documented at 24 of these locations.

Fifteen fish kills were reported in the State during these two years with industrial discharges the cause in 27% of the cases, pesticides in 13%, and natural factors in 40%. No cause was determined in 20% of the cases.

Sampling for contamination by toxics was conducted in both fish tissues and sediments. Zumbro Lake and St. Louis Bay continue to occasionally show levels of mercury near the Food and Drug Administration action level. PCBs continue to be measured in fish collected from the Minnesota River, Cedar River, Blue Earth River, St. Louis River, Mississippi River, and Zumbro Lake. Most recent data, consistent with national trends, indicate an average drop in PCBs for all stations on the Mississippi River of 49%. PCB contamination of the sediment is a problem in the North Channel of St. Louis Bay, Austin Mill Pond of Cedar River, and Pipestone Creek below Pipestone. Polynuclear aromatic hydrocarbons (PAHs) have now been detected in the sediments of two river systems, the St. Louis River and Pipestone Creek. Further testing to determine the extent of PAH contamination is occurring on the St. Louis River.

Case studies of pollution control efforts were made of the Minnesota River, St. Louis Bay, and Mississippi River. The physical land characteristics of the Minnesota River watershed, combined with agricultural land use practices, presently dictate the quality of the river water. Since nonpoint source inputs of nutrients and suspended solids are so substantial, no immediate improvement is projected in the river water quality.

Elimination of several municipal and industrial point source discharges and construction of a new, sophisticated regional municipal treatment plant at Duluth have dramatically improved water quality in the St. Louis Bay. The effectiveness of point source control here has been demonstrated with improving trends in total phosphorus, total ammonia, BOD, and dissolved oxygen.

The costs and benefits of achieving the fishable-swimmable goal in the Twin Cities Metropolitan area of the Mississippi River were evaluated. Problems which continue to plague the river include water quality standard violations for dissolved oxygen, ammonia, and residual chlorine; contamination with industrial wastes such as copper, cadmium, and mercury; and combined sewer overflows. Combined sewer overflows are the primary obstacle to achievement of the swimmable goal in this area.

After sampling and data evaluation, 500 of Minnesota's lakes were categorized: 70% exhibited characteristics of eutrophication, 26% were of transitional quality, and 4% were of low fertility. Although no lakes in Minnesota have been found to be either acidic or acidified, some 2,500 to 3,700 lakes are potentially sensitive to acid rain.

Since 1978, the routine ground water monitoring program has sampled 318 wells/springs in order to characterize 12 principal aquifers in the State. Identification of sites of known ground water pollution have been made through the efforts of two Agency teams. The Hazardous Waste Strike Force logged 54 sites Statewide where improper disposal of hazardous waste has resulted in ground water contamination. The Emergency Response Unit is monitoring 32 sites contaminated by spills and leaks.

Mississippi

For complete copies of the Mississippi 305(b) Report, contact:

Mississippi Department of Natural Resources
Bureau of Pollution Control
P.O. Box 10385
Jackson, MS 39209

Summary

Current water quality and trends were evaluated for 36 major ambient stream monitoring stations operated in the State. The Bureau of Pollution Control has documented the maintenance of good water quality or improvements in water quality at 31 of these 36 stations. Each stream was evaluated using existing data, including physical-chemical parameters, fish flesh analyses, and biological evaluations.

A compilation of all existing water quality data for 28 significant lakes in the Mississippi Delta was completed as part of the Agricultural Assessment in 208 Planning. Lakes found to be most heavily polluted by agricultural nonpoint sources are Swan Lake, Six-Mile Lake, Horseshoe Lake, Pinchback Lake, Roebuck Lake, Lake Henry, and Hampton Lake. The lakes most heavily polluted by bacteria from residential areas are Blue Lake, Moon Lake, and Tchula Lakes. Fish data in the lakes reveal significant declines of DDT and its derivatives and toxaphene since 1976. Additional assessments of lakes in the State will be completed as part of the Clean Lakes Program during 1982.

Special Environmental Problems

Gulf Coast Bacteria Studies - Since 1973, the Bureau of Pollution Control has collected fecal coliform data along the swimming beaches of the Mississippi Gulf Coast. Significant improvements, especially at Ocean Springs Harbor, should be realized with implementation of ongoing facilities planning. A model procedure is being developed to help track down and correct sources of bacterial contamination from storm drains.

Chlordane Problem in the Mississippi River - The Bureau of Pollution Control is currently assisting the State of Tennessee in assessing an apparent chlordane problem in fish in the Mississippi River near Memphis. The State will collect fish at three locations during 1982.

Pollution Problems in Petroleum Producing Areas - An ongoing study has revealed that oil field activities in the past have apparently caused pollution problems in streams and ground water in some sections of the State. These problems may be due to improper salt water disposal. Significant improvements in disposal techniques have been implemented in recent years.

Ground water - An assessment of ground water pollution problems was made. Problems were found due to overpumping, oil field contamination, surface contamination, and natural conditions.

Drinking Water Supplies - Only three cities in Mississippi use surface water supplies. These are Columbus, Jackson, and Meridian. Each of these cities is experiencing problems caused by increased urban growth.

The major water pollution problem areas in Mississippi are the Mississippi Gulf Coast and the Mississippi Delta. Other problem areas are the Pearl River below Jackson; the Meridian area; the Tupelo area; the Escatawpa River; and the Bayou Casotte-Bayou Chico area.

Environmental Improvements

Numerous municipalities and industries have contributed significantly to improved water quality in the State through new construction and improved operation and maintenance of existing waste treatment facilities. Thirty-one of 36 major water quality trend stations have been documented as maintaining good water quality or showing improvements over the past seven years. During the past two years, at least 20 industries have achieved compliance with State and federal laws where they previously had been out of compliance. Regional facilities in the Jackson and Gulf Coast areas are progressing rapidly and will be in operation in the near future. An innovative lagoon treatment system known as Hydrograph Controlled Release has been developed by the State and should enable numerous towns to meet water quality standards. Finally, between 20 and 25 municipal construction grant projects will be completed this fiscal year. These new treatment and collection systems should contribute greatly to improving water quality.

Missouri

For complete copies of the Missouri 305(b) Report, contact:

Missouri Department of Natural Resources
Division of Environmental Quality
P.O. Box 1368
Jefferson City, MO 65102

Summary

The mandate to protect water quality in Missouri has been given to the Department of Natural Resources through both Missouri and federal Clean Water Laws.

The Department recognizes two basic kinds of water pollution and uses different strategies for their control. Point source discharges, those that come from a discrete source such as the end of pipe, receive most of the Department's attention. In the last few years, however, increasing attention has focused on identifying nonpoint water pollution sources, primarily surface runoff from agricultural and mined lands and from urban areas.

The quality of Missouri streams and lakes is monitored at many locations by various government agencies and certain other organizations. The most comprehensive monitoring is done by the U.S. Geologic Survey (USGS), which maintains 13 stations across the State that are sampled every 2 months, and by the Missouri Department of Natural Resources, which cooperates with USGS in monitoring 15 stations across the State on a monthly basis.

The Department of Natural Resources issues the National Pollutant Discharge Elimination System (NPDES) permits for Missouri. All point source dischargers are required to obtain a permit that stipulates the amount and/or the concentration of contaminants within wastewater that can be discharged. The permit process allows the State to maintain records of the amounts and kinds of pollutants being discharged, and the location of the discharge.

As the relationship between point source discharges and the waters being protected is understood more clearly, the NPDES permit process should be the most effective administrative method to match levels of wastewater treatment with instream water quality needs.

Section 208 of the federal Clean Water Law amendments, PL 95-217, called for the development of plans to control all water pollution sources. Three separate nonpoint planning areas have been designated: the St. Louis area, the Kansas City area, and the remaining parts of the State. A summary of the results of 208 planning in Missouri is given.

The first step in the water quality management process, and the main purpose of this report, is to identify water quality problems. General and specific water quality problems are discussed for each of the eight major basins in the complete report.

Montana

For complete copies of the Montana 305(b) Report, contact:

Montana Department of Health and Environmental Sciences
Water Quality Bureau
Cogswell Building
Helena, MT 59620

Summary

There is a large backlog of water quality problems in Montana; most of these problems date back to an era of resource exploitation before laws were enacted to protect the environment and before the relationship between a clean environment and human health and prosperity was understood. Efforts to correct these problems are shared by many government agencies and citizen groups, but continue to be hampered by a severe shortage of planning and implementation funds.

Montana's "Big Three" water quality problems are sediment, salinity and water depletion. These problems are, for the most part, the consequence of intensive agricultural practices on an erosive, salt-rich and sometimes water-poor landscape. Collectively, they account for more than 4,000 miles of degraded streams. They have been present in Montana for a long time and are expected to continue as long-term problems.

There are also other major problems. Acid mine drainage has affected many western mountain streams since the days Montana first became known as the "Treasure State." Careless disposal of toxic and hazardous wastes, much of these from the early mining industry, threaten water quality and public health. Historic overcutting and natural deforestation of some timbered watersheds have caused severe erosion, sedimentation, and hydrologic instability.

The Clean Water Act goal of "fishable and swimmable waters" by 1983 will not be met for more than 200 stream segments in Montana. Without an infusion of implementation funds for correcting existing nonpoint source pollution problems, the list of problem segments won't be much shorter when Montana's next water quality report is written in 1984. But with adequate funding for the pollution control programs described in this report, the list should not be longer.

Recent data were available to evaluate problem severity on 99 of the 216 apparent and potential problem stream segments in Montana. Of these, 32 problems were judged to be largely man-caused and improvable under the existing regulatory framework and pollution control programs. Muddy Creek near Great Falls is Montana's worst documented water quality problem.

Ground water represents only a small fraction of the water used in Montana, but it is often the only available source of potable water. Major categories of ground water contamination are saline seep, mining, accidental spills and leakage, septic tank drainfields, oil and gas exploration and development activity, solid waste disposal sites, and municipal and industrial wastewater disposal systems. Although there are many isolated cases of ground water pollution from surface activities, no widespread contamination of drinking water aquifers has occurred.

This report also discusses five water quality issues which the State believes will be gaining importance in the future: acid deposition, especially in northwestern and southcentral Montana; ammonia discharged from eight community treatment plants which is thought to affect aquatic life; energy development, which will require careful planning if surface and ground water pollution is to be avoided; placer mining, which is difficult to monitor but causes sedimentation and other effects; and toxics, which are not currently a problem but could become so.

Many government agencies and local water quality improvement projects are chipping away at the backlog of nonpoint problems. Water pollution control structures have already been installed along Bluewater Creek in Carbon County to correct a long-standing streambank erosion problem. Farmers along Pipestone in Jefferson County have a plan for managing a similar problem and will be approaching the 1983 Legislature for implementation funds. Nevertheless, without a massive infusion of implementation funds, there is little hope for a general improvement in water quality Statewide.

More success has been achieved in point source pollution control. Six stream segments listed in the 1976 water quality report as impaired by municipal wastewater discharges were eliminated as problems for this year's report either because of improved treatment provided by upgraded facilities, or because of greater resolution of the instream effects, achieved by intensive surveys.

Nebraska

For complete copies of the Nebraska 305(b) Report, contact:

Nebraska Department of Environmental Control
Water Pollution Control Division
Water Quality Section
P.O. Box 94653
State House Station
Lincoln, NB 68509

Summary

Stream water quality was assessed in each of Nebraska's 13 major river basins. This appraisal was made from water quality data collected from the ambient monitoring network and intensive surveys. The assessment was divided into two phases: 1) historic water quality, and 2) existing quality (1980-1981).

A brief overview of general water quality trends for basins of the State, as depicted by Water Quality Index values, is presented. Generally, data collected over the previous five to ten years seem to suggest that most streams in Nebraska possess relatively good water quality. For the most part, water quality remained unchanged, with a few instances of improvement (Papillion Creek - Missouri Tributaries River Basin) and degradation (Lodgepole Creek - South Platte River Basin). Historically, stream water quality in the eastern one-third of the State appeared to be of a lesser quality than in the rest of the State. This can be attributed to the more intensive agriculture practices and the presence of more urban commmunities in eastern Nebraska. The basin in which the greatest water quality improvement has occurred is the Missouri Tributaries Basin. The Papillion Creek Watershed, particularly the West Branch of Big Papillion Creek and Big Papillion Creek, has exhibited the greatest improvement in water quality. The reason for this improvement is the completion and use of an interceptor system to collect sewage from the surrounding metro-Omaha area and carry it to the Papillion Creek Sewage Treatment Plant.

The point sources which most frequently affect Nebraska's water quality, or have the potential to do so, are municipal sewage treatment plants, industries, livestock confinements, and mining activities. The most important nonpoint sources are urban stormwater runoff, livestock grazing, agricultural runoff, and irrigation return flows (physical impact).

The construction grants program has been successful in improving waste treatment and the subsequent protection of beneficial uses ascribed to Nebraska waters. A survey developed by EPA in 1980 estimated that nearly 362 million dollars would be required by the year 2000 to meet the needs of system components eligible for funding in Nebraska. However, future availability of funds is projected to be less than this need. Therefore, future funding priorities must focus on assisting communities located on high priority waters, where the greatest benefit can be realized.

The table below presents a summary of Nebraska's water quality for the past five to ten years for 13 river basins.

River Basin	**General Overall Water Quality**	**General Overall Water Quality Trends**	**General Comments**
Big Blue	Fair/ Good	Relatively Unchanged	Water quality appeared to have deteriorated in the upper reaches of the Big Blue River
Elkhorn	Fair/ Good	Unchanged	Water quality of the Elkhorn River appeared to have become somewhat degraded in a downstream direction
Little Blue	Fair/ Good	Unchanged	Water quality throughout the basin seemed to exhibit significant yearly variation
Loup	Very Good	Unchanged	Streams with very high water quality are located within the basin
Lower Platte	Fair/ Good	Unchanged	Water quality in lower reaches of Salt Creek appeared to be relatively poor
Middle Platte	Good	Unchanged	Water quality in the Platte River within the basin appeared quite good
Missouri Tributaries	Fair	Improved	Water quality in the lower Papillion Creek system was markedly improved after an interceptor system was installed
Nemaha	Fair/ Good	Unchanged	Water quality throughout the basin appeared subject to yearly variation
Niobrara	Very Good	Unchanged	Water quality of the Niobrara River appeared to have remained stable and is quite good
North Platte	Very Good	Unchanged	Water quality throughout the basin appeared to be quite good
Republican	Good	Unchanged	Water quality throughout the basin is relatively good, though subject to yearly variation
South Platte	Good/ Poor	Unchanged/ Degraded	Water quality in the South Platte River appeared relatively good. Lodgepole Creek appeared to have deteriorated to a poor quality
White/Hat	Very Good	Unchanged	Water quality of the White River appeared quite good

Nevada 1980

For complete copies of the 1980 Nevada 305(b) Report, contact:

Department of Conservation and Natural Resources
Division of Environmental Protection
Capitol Complex
Carson City, Nevada 89710

Summary

The quality of the major water courses of the State of Nevada—the Colorado, Humboldt, Truckee, Carson and Walker Rivers—are discussed below.

The Colorado River met water quality standards, provided for the protection and propagation of fish and wildlife, and allowed for excellent recreational activities in and on the water. The high water level in Lake Mead probably contributed to the conditions by diluting the high pollutant loads entering Lake Mead via Las Vegas Wash. The Virgin River, a tributary to Lake Mead, exhibited poor water quality in terms of bacteria, aesthetics, solids, inorganic toxicity, and very minimal fish life.

The Humboldt River, in general, met water quality standards except for severe violations of turbidity standards in the upper reaches and phosphate standards in almost all reaches. The river has a highly variable flow with a major irrigation-recreation reservoir on the lower end of the system and a terminal sink. High nutrient loads and ambient air temperatures contribute to aesthetically displeasing conditions below the reservoir. Although the sink is highly saline, it supports a balanced wildlife habitat. The various communities along the river system have either moved or are moving to land application as the treatment method for their wastewater. This will result in reduced organic and nutrient loads.

The Truckee River showed improvement in aquatic life below Reno/Sparks because of control on toxics. However, there were severe violations of phosphate standards downstream of Reno/Sparks with resultant nuisance and aesthetic problems. The lowest control point on the river experienced temperature, pH, nutrients, and inorganic toxicity problems. The river provides for the protection and propagation of fish and wildlife and allows for recreational activities in and on the water. However, due to low flow conditions, denuded banks, channelization, and man-made barriers in the lower reaches, natural spawning of cutthroat trout does not occur. The reduction of nutrient loads will improve the conditions for fish in the stream and for fish and recreation at Lake Lahontan and Pyramid Lake.

The Carson River's water quality standards for nutrients were frequently exceeded for all reaches, including that point where the river enters the State. The greatest violations of standards occurred during the summer months below Carson City, when extreme low flow occurred and wastewater effluent was the majority of the flow in the stream. An intensive survey conducted in August and September indicated that the salinity of the river in 1979 was the same as in 1966. At the time of the survey, irrigation returns were minimal, only one treatment plant was discharging to the river, and river flow was very low. The survey also revealed that all reaches above the treatment plant were of suitable quality for all beneficial uses, and that reaches below the treatment plant had high nutrient values which affected the suitability of the river for aquatic life, aesthetics, and recreation. Water quality measurements in Lake Lahontan also showed high nutrient concentrations with large algal blooms which interfered with aquatic life, aesthetics, and recreation. The planned upgrading of municipal discharges will begin to reverse the trend of deterioration which has been occurring over the last thirteen years.

Walker River water quality data reflected minor violations of water quality standards for dissolved oxygen, temperature, nutrients, solids, and aesthetics with no appreciable effect on aquatic life, recreation, or other beneficial uses. However, reports were received of effects on agricultural use because of high sediment loads being deposited in irrigation ditches and fields. No municipality in Nevada discharges to the Walker River.

An evaluation of recreational use impairment of 11 lakes in Nevada by EPA Region 9 indicated that one lake was severely impaired for swimming and aesthetics; two lakes were moderately impaired for aesthetics; three lakes were moderately impaired for swimming and boating; and four lakes were moderately impaired for fishing.

The implementation of proposed sewerage projects through FY 85 totaling approximately $105 million in estimated EPA assistance, along with implementation of best management practices for new and existing development and on farms and ranches, should result in improvement of the Truckee, Carson, Humboldt and Colorado river systems as well as some minor river systems. Fish propagation and water-related recreational activities will be protected.

Implementation of the proposed sewerage projects is significant in meeting the 1985 goals of the Clean Water Act, since the majority of the projects will be using some form of land application.

Agriculture and rangeland are two nonpoint sources which contribute large sediment loads to Nevada's waters. Urban drainage systems contribute nutrients, heavy metals, and organic loads. Nonpoint source problems caused by existing on-lot disposal will be resolved by implementing sewerage projects which eliminate on-lot disposal. Strict enforcement of regulations for on-lot disposal and permitting of subsurface disposal systems will prevent such disposal methods for new development from causing ground water pollution or nonpoint source problems.

New Hampshire

For complete copies of the New Hampshire 305(b) Report, contact:

New Hampshire Water Supply and Pollution
Control Administration
Hazen Drive
P.O. Box 95
Concord, NH 03301

Summary

This report is intended to provide an assessment of the status of water pollution control programs in New Hampshire and to fulfill the requirements of Section 305(b) of the 1977 Clean Water Act (PL 95-217). As such, it represents an evaluation of progress toward the attainment of classified water quality and the goal of fishable/swimmable surface waters set for July 1, 1988.

The table below provides a basin-specific summary of the water quality of New Hampshire streams. Approximately 507 river miles of the total 14,500 miles of streams are currently violating water quality standards. This represents only 3.5% of total stream miles but includes economically and recreationally important river segments. About 97 miles of surface waters have improved since the 1980 Report to Congress and are now fishable/swimmable according to New Hampshire water quality criteria.

Water Quality Summary

River Basin	Total River Miles Violating Water Quality Standards	Total Miles Not Expected to Meet Class B or Better by July 1, 1988	Total Miles Upgraded Since 1980 Report to Congress
Androscoggin	19.1	16.8	2.5
Connecticut	273.7	20.4	33.3
Merrimack	152.3	15.0	36.9
Piscataqua and Coastal	61.4	0	24.0
Saco	0.4	0	0
TOTAL	506.9	52.2	96.7

This table notes that aproximately 52 miles of river are not expected to meet Class B or better by July 1, 1988. This represents less than one half of one percent of total stream miles. These are legislatively classified "C" segments that will in most cases attain legal "C" standards by this date and will, therefore, be fishable. It is expected that by 1988 more than 99 percent of assessed river mileage should meet Class B (fishable and swimmable) standards or better, based on expected continuation of the federal construction grants program.

Major remaining point source problems involve the discharge of inadequately treated municipal and industrial wastes, combined sewage, and untreated domestic discharges. The resolution of many of these problems hinges on the construction grants program, State resources, and local resolve.

Widespread water quality degradation caused by nonpoint sources of pollution (agricultural runoff, leachate from landfills, etc.) has not been documented. Local areas of ground and surface water impacts from such sources are known but are limited in extent.

Several illegal hazardous waste sites have been discovered over the last two years including the well documented Sylvester (Gilson Road) site in Nashua. Significant federal, State, and local resources have been drawn upon to cope with existing problems.

Recent lake studies have attempted to evaluate problem lakes as well as clean lakes. One Clean Lakes grant allowed for the inventory and classification of 171 of New Hampshire's more than 1,300 lakes and ponds. Information and priority rankings for needed restorative and protective measures are presented in the New Hampshire report.

The impact of acid precipitation on New Hampshire lakes and streams is receiving increasing investigation. Current information indicates that residual buffering capacity in at least 23 lakes is nearly or completely depleted. Once the alkalinity is gone, the lake pH drops and drastic changes in aquatic life occur.

Due to the potential for long and short term impacts to water quality, fish, other aquatic life, and wildlife associated with oil spills, New Hampshire has undertaken comprehensive oil spill control and prevention programs. Over the past three years, nearly 300 spills or oil-related complaints have been investigated.

The costs for providing for pollution abatement have been significant. Construction grants, including State and federal shares, for publicly-owned wastewater treatment facilities during 1980 and 1981 totaled 95 million dollars. Future costs for wastewater facilities and appurtenances to achieve the 1988 goals and use classifications for New Hampshire streams are provided based on the 1980 Needs Survey performed jointly by EPA and the State.

New Jersey

For complete copies of the New Jersey 305(b) Report, contact:

New Jersey Department of Environmental Protection
Division of Water Resources
P.O. Box 1390
Trenton, NJ 08625

Summary

Surface Waters

Surface waters in New Jersey have shown no significant improvement or decline in quality over the last 4-5 years based on conventional data collected at the monitoring stations reviewed in the surface water quality inventory. Overall, for conventional data reviewed in the 1982 water quality inventory which can be compared to respective State Surface Water Quality Standards, these standards were exceeded by 45 percent of the total phosphorous values, 4 percent of the dissolved oxygen values, 3 percent of the un-ionized ammonia values, and 2 percent of total dissolved solids readings. In addition, the data indicate that widespread fecal coliform contamination exists in the surface waters of the State. The sources of bacteria are, for the most part, nonpoint in origin (based on the assumption that point sources of pollution are properly disinfecting) while the nutrients (phosphorous) originate from both point source discharges and nonpoint runoff. Because of the large percentage of samples containing high total phosphorous concentrations, most standing waterbodies in the State have excessive aquatic plant growth and are classified as eutrophic.

Many streams in northeastern New Jersey (Passaic, Hackensack, and Raritan River basins) experienced significantly reduced water quality between the summer of 1980 and early 1981 because of a severe lack of rainfall. The water quality impacts of the drought were generally reflected in reduced dissolved oxygen (DO) readings and increased fecal coliform, biochemical oxygen demand, nutrient, and un-ionized ammonia concentrations. By the end of the monitoring period used in this report (mid-1981), waterways had shown general recovery to pre-drought conditions. Stress to aquatic life probably occurred during the drought because of the reduced DO and increases in un-ionized ammonia concentrations.

The NJ Divison of Fish, Game and Wildlife has found in studies of coastal bays and estuaries that very low DO levels often occur in these waters during summer months. Because of these low DO levels, the coastal bays and estuaries are very sensitive to oxygen-demanding pollution loads.

Toxic chemicals (including volatile organics, pesticides, PCBs, and heavy metals) in the water column, sediments, and fish tissue seem to be fairly widespread at very low concentrations, depending on the substance and the medium sampled. Volatile organics were found at their highest levels in waters adjacent to or flowing through industrialized urban/suburban centers. Metals, PCBs, and pesticides were found throughout the State in fish tissue, but appeared highest in catadromous and anadromous fish species. A review of the effects of toxic contaminants on both aquatic and human health is available from the NJ Division of Water Resources.

Ground Waters

The major ground water concerns outlined in this report deal with both quality and quantity. A lowering of ground water levels in many of the coastal plain ground water-bearing formations (aquifers) is occuring due to overpumpage. This is affecting both quality and quantity of these formations. Overpumping also affects baseflows to streams in the area since ground water is a major contributor to stream flows. More efficient use of the relationship between ground and surface waters is suggested for the coastal plain region of New Jersey.

Across the State, ground water quality is generally suitable for drinking water purposes without treatment. The common natural quality problems include high iron, dissolved solids, manganese, and hardness levels due to the natural quality of rock and sand formations. Other quality problems are occurring because of localized ground water pollution and salt water intrusion. Salt water intrusion is occurring at various locations along the coast of Raritan Bay, the Atlantic Ocean, and tidal Delaware River as a direct result of excessive pumping. Ground water pollution occurs from a variety of sources including landfills, surface impoundments, accidental spills, on-site waste water disposal systems, and numerous other sources. Currently, the NJ Department of Environmental Protection has closed 74 public supply wells and 697 non-public supply wells since 1971. Most of these wells are closed because of excessive organic and industrial chemicals.

New Mexico

For complete copies of the New Mexico 305(b) Report, contact:

New Mexico Water Quality Control Commission
P.O. Box 968
Santa Fe, NM 87504-0968

Summary

Ground Water Quality: The New Mexico Environmental Improvement Division (EID) has identified 105 sites in New Mexico with known ground water contamination problems. The nature and extent of the contamination at these 105 sites vary greatly. Twenty-five of these sites have been contaminated by organic compounds such as hydrocarbon fuels and solvents, 47 by brine or total dissolved solids, 22 by nitrates, 6 by trace metals and/or radionuclides, and 5, along shallow alluvial aquifers, by fecal coliform bacteria.

It is estimated that at least 18 percent and possibly as many as 58 percent of known contamination sites involve abandoned or currently inactive facilities. For this reason, and because the State since 1977 has pursued a vigorous program to regulate discharges to ground water, it should not be assumed that contamination continues at these sites. Nearly all of the instances in New Mexico where water uses have been affected by contaminated ground water have involved either regional saline intrusion or relatively small areas in shallow aquifers. The limited extent of contamination at most sites has been largely due to complex natural factors, rather than contaminants in a discharge.

Surface Water Quality: Data from 64 monitoring stations throughout the State for the period 1976-1981 indicate that stream water quality is good, in general, when compared to water quality standards. Water quality is consistent with standards in over 90 percent of the estimated 3,500 miles of perennial streams in New Mexico.

Significant standards violations, caused by both point and nonpoint source pollution, were recorded in an estimated 200 miles of perennial streams distributed among 6 of the 59 designated stream segments. In addition, occasional stream standards violations were recorded in eight stream segments.

In addition to these specific stream segments, more generalized problems are experienced with both turbidity and fecal coliform bacteria. Eleven monitoring stations, distributed among eight of the State's 11 water quality basins, showed between two and 15 instances of elevated fecal coliform bacteria levels. These are generally related to summer thunderstorm activity and are probably caused by nonpoint sources.

Data regarding turbidity, and the associated water quality problems of suspended sediment and total dissolved solids, have been delineated in detail in prior State water quality reports. Recent data do not provide the basis for new or more detailed conclusions regarding the water quality problems associated with these parameters. Stream turbidity standards were violated occasionally during the last five years at 13 monitoring stations; only two stations indicated five or more violations. In those stream segments which have standards for total dissolved solids, conductivity, chlorides, or sulfates, no standards violations were noted.

Limited monitoring to date in New Mexico has not demonstrated significant surface water contamination by heavy metals, trace organics, pesticides or other toxicants attributable to industrial or agricultural use.

The major improvement noted in stream quality since the State's 1980 report is in the decrease of standards violations for fecal coliform bacteria. Data for three stream segments identified in 1980 as significantly contaminated by bacteria indicate no more than one standards violation in the last two years. These segments are the Rio Grande below Las Cruces and below Espanola, and the San Juan River below Farmington. The 1980 report did note that improvements in these municipalities' wastewater treatment had recently eliminated their bacterial contamination of these streams.

New York

For complete copies of the New York 305(b) Report, contact:

Division of Water
New York State Department of Environmental Conservation
Albany, NY 12233

Summary

In New York State, the water quality management problems which most commonly contribute to serious water pollution and affect the largest percentage of the State's population are: municipal discharges; industrial discharges; residual wastes (solids and liquids); combined sewer overflows; urban storm runoff; acid precipitation; and hydraulic/hydrologic modifications.

By traditional standards used to measure organic oxygen-consuming wastes and infectious agents, the overall level of water quality indicates definite improving trends. New York State has made great progress in controlling point source discharges of raw sewage and industrial wastes. Over 90 percent of the State's 70,000 stream miles are in conformance with current water quality standards. This is a significant accomplishment of the State's water management program over the past 15 years. About 1,200 miles are affected by pollution to the degree that water use is impaired as a water supply source, unsuitable for recreation, or unable to support a balanced biological and fish population.

The construction of new and upgraded municipal sewage treatment facilities has drastically reduced the amount and/or the concentrations of pollutants entering our surface and ground water systems. The number of municipal sewage treatment plants has increased from 298 in 1952 to 509 in 1980. More significantly, the type of treatment provided by these facilities has improved substantially.

A water quality management problem which is encountered frequently in New York State is that of accidental leakage and spills of oil and other hazardous substances. Many ground water resources are sufficiently impaired to preclude utilization as drinking water, and public water supplies have been closed due to contamination.

Nonpoint sources of pollution also pose potentially serious water quality management problems throughout the State. However, the magnitude and severity of these problems vary widely, depending upon the type and location of the nonpoint source activity. Agricultural practices, silviculture, construction activities, and acid precipitation are recurrent problems. A number of nonpoint source pollutants have been identified; the extent or degree to which they affect water quality has not been fully assessed. Appropriate water quality management programs will be developed to help solve those problems which may be identified as severe.

New York's most serious current water quality problems relate to toxic substances in the environment. In the mid-1970s, attention was directed to a "second generation" set of problems associated with the disposal of toxic effluents and residual wastes. In an effort to more closely define the problems asociated with toxic substances, New York's Division of Water conducted a survey of New York industries to track down the exact types and amounts of chemicals being used or manufactured in the State and instituted sampling of waterways, sediments, and fish flesh to determine levels of toxic substances in the environment. In some cases where toxic substances have been identified and their passage into receiving waters can be traced to industrial discharges, permit controls have been instituted to control releases. In other cases, it is suspected that some toxics may be transported into receiving waters through runoff from nonpoint sources.

North Carolina

For complete copies of the North Carolina 305(b) Report, contact:

North Carolina Department of Natural Resources
and Community Development
Division of Environmental Management
Raleigh, NC 27611

Summary

North Carolina is divided into three distinct regions, each of which has its own unique water resource benefits and problems. The mountain region is characterized by high mountain peaks, dense woodlands, and relatively sparse population (15% of the State's population). The water quality in this region is good with the many spring fed mountain streams providing high quality waters which support many excellent trout fisheries. While the cold turbulent waters of this region are capable of assimilating much larger quantities of oxygen consuming materials than the Piedmont and Coastal waters, the protection of sensitive fish species such as trout requires that even slight degradation of water quality be prevented. It is estimated that recreational fishing across the State generates revenues of over $300 million annually.

The Piedmont region is characterized by much lower elevations and gently rolling hills. Since this region is the most populated (53% of the population) and industrialized area of the State, a tremendous demand is placed on water resources. Not only does the Piedmont region contribute the heaviest waste load to the waters, but it also has the greatest demand for clean water for public and industrial consumption and for recreation. As would be expected, the majority of the State's water quality problems occur in this region.

The Coastal Plain region is characterized by generally flat terrain spanning from the higher elevations near the Piedmont to the low lying swamplands in the east to the sandy beaches of the coast. The water quality in this region is generally good except in areas of dense population (32% of the State's population lives here). The waters in this region have higher temperatures and are slow moving and sluggish, thus they can assimilate much less oxygen demanding substance. Drainage from the swamplands often causes naturally occurring low oxygen levels, low pH, and high color in streams in the area. Since the coastal waters receive the residues from the interior parts of the State, there is potential for water quality problems, especially deposits of harmful substances and nutrient over-enrichment, in the bays and sounds inside the Outer Banks. The protection of fish and shellfish in the coastal waters is especially important in this region since the harvesting of shellfish and commercial sport fishing is a major resource of the area.

Progress has been made in cleaning up pollution on all fronts. Not only were a few new areas in coastal waters classified as shellfish waters, but over 100,000 fewer acres of shellfish waters had to be closed because of pollution. Better cooperation on limiting sediment from construction operations is being obtained as more people become aware of the problem and understand ways to limit the transport of sediment. Agricultural activities continue to contribute sediment and nutrients to waterways but, again, education is slowly making a difference.

The number of degraded streams or stream segments that do not meet the stream standards a significant proportion of the time has been reduced from 410 in the last biennium to 259 at the end of 1981. Also, the number of streams that carry dissolved oxygen and/or coliform exceptions to their standards was reduced from 35 to 27.

Drinking water supplies have continued to meet all standards with very few exceptions. The focus on trihalomethanes (THMS)—carcinogens that are formed when natural organic constituents of surface waters are disinfected by using chlorine—has led to modifications in the treatment process. So far the standards have been met, though in some cases this was a difficult task.

North Carolina has a long coastline. Problems arise in the estuaries from septic tank nitrification line seepage; nursery areas are affected by fresh water flushes during wet periods from excessive drainage from ditched agricultural lands. This problem will require a solution in the near future if nursery areas are to be preserved.

Several programs have a large impact on State water quality. The construction grants program, for which funding is now being reduced, has made possible the large increase in the number of treatment plants that can adequately treat the waste they receive. The North Carolina Waste Water Treatment Plant Operator Training and Certification program plays a large part in making treatment plant operation reliable and in ensuring that plant effluents meet the criteria for which the plant was designed. The Environmental Laboratory not only provides analytical information but also has a certification program for commercial laboratories.

North Dakota

For complete copies of the North Dakota 305(b) Report, contact:

North Dakota State Department of Health
Division of Water Supply and Pollution Control
1200 Missouri Ave.
Missouri Office Building
Bismark, ND 58505

Summary

Water quality degradation of the streams located within North Dakota results primarily from natural substances occurring in the soils of the State and is aggravated by a number of point and nonpoint sources.

Presently there are no municipal facilities in North Dakota discharging completely untreated wastes into the waters of the State. Some, however, provide less than the desired level of treatment for several reasons, such as a lack of storage capacity or a lack of resources to provide upgraded treatment. A number of municipalities will need additions, modifications, and completely new facilities in order to comply with permit requirements.

There do not appear to be any significant stream degradation problems from major industrial dischargers. Major industrial sources include power plants, sugar beet processing plants, and oil refineries. Minor industrial sources include potato washing plants, sand and gravel operations, water treatment plants, and coal mines. Most industrial and municipal point source discharges are intermittent discharging stabilization ponds or lagoon systems.

There are a few combined sewer systems located in the older cities in the State. The major problem with combined sewers is the overflow discharge of diluted, untreated wastewater to a stream or other receiving body as a result of intermittent heavy flows due to rainstorms or snowmelt. Most of the affected cities are presently involved in combined sewer separation projects.

North Dakota's nonpoint source pollution control programs have achieved significant success in certain areas during the past years. These programs can be divided into two areas of emphasis: watershed controls that are an integral part of lake restoration projects, and demonstration projects which serve education/research purposes.

Nonpoint pollution sources are responsible for most of the surface water degradation in North Dakota. The Department's Surface Water Quality Monitoring Program has indicated that the quality of surface waters has not been enhanced in proportion to the rapid advances that have been achieved during the past years by municipalities, industries, and other point sources in providing adequate treatment of their wastes. Violations of certain parameters of the State's Water Quality Standards have been noted at times when records reveal there have been no discharges into the stream from point sources. Nonpoint pollutants include sediment and plant nutrients, wastes from stock raising activities, and runoff from croplands, rangelands, pastures, farmsteads, and urban areas containing nutrients, pesticides, and other pollutants.

The water quality problems associated with the major drainage basins of the State are noted in detail in the water quality analysis section of the North Dakota report. Phosphorous is the only parameter which was found to be a problem in most streams. Agricultural Best Management Practices which reduce soil loss may reduce the amounts of phosphorous in runoff to a level approaching that of natural or baseline conditions. Historically, dissolved solids concentrations may reach impairing levels in nearly all streams and rivers in the State during low flow conditions, which normally occur in late summer, fall, and winter.

North Dakota has experienced only minor ground water quality problems. Contamination of aquifers has been limited to small areas and aquifers of poor quality, and has been caused by bacteriological contamination of shallow aquifers by septic tank drainfields, leachate from solid waste disposal sites entering the ground water, and natural sources of contamination. A large portion of the State's ground water resources are located at a depth which naturally protects them from manmade sources of pollution. The areas where shallow table aquifers exist have experienced very few contamination problems due to the absence of industry and other detrimental land uses above these aquifers.

Although the State has encountered only minor ground water contamination incidents, the potential for future incidents exists. The North Dakota State Department of Health, in conjunction with the North Dakota Geological Survey, has completed a surface wastewater impoundment assessment; it indicated that many surface impoundments are sited in geologically poor conditions and therefore have high pollution potentials. Also, potential ground water quality problems exist in the western part of the State due to mining, oil and gas exploration, and other energy related impacts.

Northern Mariana Islands

For complete copies of the Northern Mariana Islands 305(b) Report contact:

Division of Environmental Quality
Doctor Torres Hospital
Saipan, Mariana Islands 96950

Summary

This is an update of the 305(b) report submitted by the Commonwealth of the Northern Mariana Islands to the U.S. Environmental Protection Agency in 1980. Only those areas with significant changes in status are discussed in this update.

Tourism remains the major industry in the Commonwealth, and the same basic problems remain: sewage disposal, ground water protection, and the prevention of environmental damage from earthmoving activities. Improvement of the drinking water supply for Saipan remains a high priority.

In response to the Governor's declaration of a Water Emergency on Saipan, a new well drilling program was started in January 1982. This program has concentrated on drilling wells in known water-producing areas. Fifteen wells have been completed to date. Many of these wells are capable of producing water of acceptable salinity and will be put into service to replace some of the older, brackish water wells.

All of the producing water wells are included in a monthly monitoring program to determine the fluctuations of water quality with time and pumping rate. The parameters measured include chloride, alkalinity, dissolved solids, conductivity, and pH.

Ohio

For complete copies of the Ohio 305(b) Report, contact:

Ohio Environmental Protection Agency
P.O. Box 118
Columbus, OH 43215

Summary

Approximately nine percent of the 43,900 permanent stream miles in Ohio have been evaluated in this report; however, 32 percent of the "principal" rivers and streams in Ohio (all subbasin mainstems plus streams draining at least 100 square miles) were evaluated. The quantity of data needed to make an evaluation was not standardized, but consisted in most cases of at least four samples per year at one or more stations. Segment delineation was usually based upon the location of sampling stations in relation to major point source dischargers and major tributary streams. Data were not extrapolated beyond significant point sources or major tributaries.

The Ohio 305(b) report contains information on administrative programs, monitoring programs, intensive surveys, lakes and reservoirs, wetlands, Lake Erie beaches, ground water, nonpoint sources, and specific chemical, physical, and biological evaluations of water quality. These subbasin evaluations reveal that Ohio's water quality is generally good. However, some segments such as lower Swan Creek and the Cuyahoga River below Akron are not expected to meet water quality goals. Municipal and industrial point source discharges and nonpoint source runoff are reported as the most common causes of water quality degradation. Significant water quality improvements have been noted in many areas, primarily due to point source controls such as municipal and industrial treatment plant upgradings.

The coastal wetlands of Lake Erie are the most extensive in Ohio. The wetlands inventory conducted in 1954 estimates that 30,000 acres of wetlands existed adjacent to Lake Erie; by 1974, only 15,000 acres of wetlands remained. Destruction of the coastal wetlands is largely attributable to development. Wetlands have been and continue to be drained, dredged, or filled for agricultural, industrial, and residential expansion. Those that survive development are generally degraded.

One hundred and nineteen (54%) of the lakes listed in Ohio EPA's public lake inventory have been classified according to trophic status. Of these, 73% were classified eutrophic, 16% were classified mesotrophic, and 11% were classified hypereutrophic. Sedimentation is also a problem in many Ohio lakes. Metal concentrations that exceeded Ohio water quality standards were observed in 34 lakes. Copper was the metal that most often exceeded Ohio water quality standards. The use of copper herbicides for the control of algae in the 21 affected lakes could be a contributing factor. The sanitary water quality of Ohio's lakes was generally within water quality standards. High fecal coliform and/or fecal streptococcus bacterial counts were associated with storm runoff events or increases in lake water levels.

The State of Ohio has abundant ground water resources due to a rather humid climate and favorable geologic conditions. Nearly 45% of Ohio's population use ground water as a drinking water source. Ground water is also widely used for industrial, agricultural, and commercial uses. Overall, ground water in Ohio has not been contaminated to any significant degree, and for the most part meets all primary drinking water standards without treatment.

Ohio River Valley Water Sanitation Commission

For complete copies of the Ohio River Valley Water Sanitation Commission 305(b) Report, contact:

Ohio River Valley Water Sanitation Commission
414 Walnut Street
Cincinnati, OH 45202

Summary

This report, prepared by the Ohio River Valley Water Sanitation Commission (ORSANCO), is an assessment of the water quality of the Ohio River and the lower reaches of its major tributaries together with information on Commission water pollution control programs for the years 1980 and 1981. The Commission is an interstate agency formed in 1948 by eight States signatory to a compact to abate existing and control future water pollution in the Ohio River Valley. This assessment is based upon data gathered from the Commission's operative monitoring systems.

Fifteen of the 20 substances for which the Commission has recommended criteria were within acceptable levels 100 percent of the time during 1980 and 1981. Of the five remaining—fecal coliform bacteria, phenolics, cyanide, dissolved oxygen (DO), and mercury—cyanide levels showed marked decreases from previous years while the other four continued to present problems. Fecal coliform bacteria levels, indicators of contamination from human and animal waste, were improved at some locations but degraded at others in comparison to previous years. The number of phenolic detections increased in the lower river and remained a persistent problem in the upper river. A phenolics reconaissance in the upper river was initiated in late 1981 in preparation for an intensive survey in early 1982. Further intensive surveys for both fecal coliform and phenolics may be undertaken during 1982.

Dissolved oxygen excursions were most pronounced in the middle and lower river during August and

September 1981, when dry weather and low flows combined to drop the DO level below the Commission recommended minimum level. However, no fish kills were reported on the mainstem during this period. The relatively moderate temperatures and gradual decline of dissolved oxygen may have enabled fish to acclimate to the river conditions.

The mercury criterion was exceeded most frequently in the middle river; the 1978-79 Section 305(b) report noted that values exceeding the criterion were scattered throughout the Valley. However, fish tissue samples analyzed in 1980 showed no excessive amounts of mercury.

Lead (found to be a problem in the 1976 and 1977 reports) and cyanide were found in decreasing amounts in river water during 1980 and 1981, probably due to the advent of unleaded gasoline and improved industrial waste treatment, respectively. Increased use of unleaded gasoline has probably been a major factor in the decrease in lead levels in urban runoff.

The three largest population centers (Pittsburgh, Cincinnati, and Louisville) all have secondary wastewater treatment facilities although they are not fully operational at Cincinnati and Louisville. Additionally, four major publicly-owned wastewater treatment plants are under construction in the Valley. During 1980-81, the U.S. Environmental Protection Agency awarded $39 million in construction grants for secondary treatment projects on the mainstem. In the same period, municipalities and industries in the Valley appeared to be completing projects at about the same rate that new project needs were identified. Of the treatment plants surveyed as having needs, three percent of the municipal facilities reported completion of construction to meet those needs during 1980-81, as did 21 percent of the industrial facilities.

This report serves the combined purpose of indicating water quality improvement, areas requiring further attention, and programs aimed at resolving water quality problems. The Ohio River system is everchanging; monitoring, surveillance, and analysis programs must be flexible enough to meet water pollution control needs as they arise. The uses that the human population of the Valley puts the rivers to are multipurpose and change in emphasis with changing times. Major new developments, such as synfuels facilities, coal slurry pipelines, and low-head hydro powerplants to be installed at the Ohio River dams, as well as the expansion of already existing uses, all carry with them the potential for environmental impact. However, with informed and perceptive management and decision-making, many of these impacts can be foreseen and resolved.

Oklahoma

For complete copies of the Oklahoma 305(b) Report, contact:

Oklahoma State Department of Health
1000 N.E. 10th
Oklahoma City, OK 73152

Summary

The State's major river basins are the Red and Arkansas River Basins. The Red River shows continued enrichment and mineralization as well as elevated levels of some metals. The lower Red River below Lake Texoma displays gradual improvement, with decreasing levels of mineralization and low levels of toxic metals, but high levels of iron and manganese. Due to these factors, fish communities show increasing diversity downstream with improving water quality conditions. Tributaries in the Red River Basin are, in general, improving or stable. The one exception is the Beaver Creek watershed, which shows severe degradation primarily from increased enrichment and toxics. The Arkansas River enters Oklahoma from Kansas with poor water quality due to enrichment and mineralization. Kaw Reservoir acts as a nutrient sink and mineral assimilator, so that water quality improves downstream from the reservoir. There is a major decline in water quality downstream from Tulsa. The fish species diversity increases farther downstream as the water quality improves. Many tributaries in the Arkansas River basin show degradation. Much of this degradation is due to point source discharges from municipalities and industries. Specific tributaries with major degradation include portions of the North Canadian River, the Illinois River, and the Cimarron River. Toxic metals and organic compounds were detected at various sites in the Arkansas River basin. Another area of concern is the Tar Creek watershed, where mine drainage is causing high levels of metals in the water. A water quality assessment of Oklahoma streams, by segment, is included in the report. The matrix rates the scope, trend, and severity of various chemical parameters and the biological condition and trend for each stream segment.

The results of a study of toxics in 48 State reservoirs show that Oklahoma reservoirs are, in general, free of dangerous levels of toxic chemicals. Greenleaf and Lawtonka had no detectable levels of these pollutants. PCBs are the most common organic toxics found in fish tissue and were detected in 44 reservoirs. Nevertheless, only at Fort Gibson Reservoir were FDA Alert Limits for PCBs in tissue samples exceeded. Chlordane was found in 40 reservoirs, with only Lake Hefner and Northeast (Zoo) Lake showing levels exceeding FDA Alert Limits. DDT was present in 11 reservoirs, with the highest level found in Fort Cobb Reservoir. DDT levels were well within FDA limits. Aldrin, heptachlor, and toxaphene were present in a few reservoirs, but were also within FDA limits.

During water years 1980-81, 38 publicly owned water supplies were in violation of drinking water standards.

The parameters violated include nitrate, fluoride, selenium, chromium, barium, trihalomethanes, and bacteria. Due to potentially harmful effects on human health, limited fishing bans were placed on Fort Gibson Reservoir in response to the discovery of PCBs in several fish species. Similar bans have been applied to Lake Hefner and Northeast Lake as a result of chlordane levels exceeding FDA Alert Limits.

Over fifteen months of high-flowing sampling data has been collected from a network of 106 sites on 48 of the State's 59 stream segments. This ongoing program should, eventually, facilitate the detection of nonpoint source pollution problems and help distinguish between probable man-induced contributions and natural background levels.

Municipal point source control is largely accomplished through efforts of the Oklahoma State Department of Health, while industrial point source control is the responsibility of the Oklahoma Water Resources Board (OWRB). The nonpoint sources for the State are generally placed under the jurisdiction of the Oklahoma Conservation Commission, with exceptions in the areas of silviculture under the Oklahoma State Department of Agriculture and industrial stormwater runoff under the OWRB.

Oregon

For complete copies of the Oregon 305(b) Report, contact:

Oregon Department of Environmental Quality
Water Quality Division
522 S.W. Fifth Avenue
Portland, OR 97204

Summary

Oregon's water quality program emphasis on problem prevention has enabled the State to maintain relatively high water quality. Efforts over the last three decades have been directed toward assuring that necessary pollution controls were provided prior to approving new industrial or municipal discharges, and that as these facilities were expanded, upgraded treatment capabilities minimized waste load increases.

Whereas several years ago a large share of municipal source control activities could be devoted to long range needs for timely construction of facilities to avert pollution problems, much of the program effort today involves assisting communities in meeting their immediate needs. Postponed and insufficient federal funding of sewerage works construction has created a considerable backlog of problems. This is not intended to suggest that accomplishments in the point source control program will not continue to be made. However, expectations have been dampened regarding the ability of the State to keep pace with a preventive approach and/or make significant strides in a short time period where problems do exist. A gradual shift in the water pollution control program effort away from a preventive and toward an abatement approach is foreseen, if Oregon's poor economic conditions continue concurrent with reduced federal project funding.

The nonpoint source program has improved water quality in Oregon. Considerable time and effort have been spent developing coherent and workable management plans for solving present nonpoint source problems and preventing future problems. The major portion of Oregon's nonpoint source effort has been funded through federal grants under the Section 208 program. As a result of the nonpoint source program effort, public awareness of nonpoint source pollution has been heightened. The implementation of identified best management practices will take time, but the need for these improved management approaches has been demonstrated.

Between 1980 and 1982, significant progress was made towards reevaluating specific beneficial uses of many of Oregon's river reaches; rating these river reaches according to whether high, medium, or low use is made of each reach; and evaluating their ability to serve the most sensitive users based on the selected criteria.

Oregon has some 1,300 named lakes and hundreds of unnamed lakes, most of which are of very high quality. For the few lakes where recreational and development pressures have led to some degradation in quality, grant applications to the Clean Lakes program were made and projects are being undertaken.

The bulk of Oregon's ground water is dependable and of high quality. In a few areas of the State, ground water has naturally poor quality due to dissolved metals, gases, and minerals, and is not always suitable for drinking or other uses. Knowledge of human-caused ground water contamination problems has increased, and the need to avert the potential for more problems has resulted in the adoption of a State ground water protection policy. The policy addresses the need to protect ground water from the improper storage and disposal of wastes from industrial, commercial, agricultural, and residential activities and sources.

Pennsylvania

For complete copies of the Pennsylvania 305(b) Report, contact:

Pennsylvania Department of Environmental Resources
Bureau of Water Quality Management
P.O. Box 2063
Harrisburg, PA 17120

Summary

Most of the past emphasis in Pennsylvania water quality management programs, as well in as the rest of the Nation, has been toward elimination of point source pollution (sewage and industrial waste discharges). However, pollution from nonpoint sources such as abandoned mine drainage, storm water runoff, agricultural and earth-moving operations, oil and gas extraction activities, and discharges to ground water have significant adverse impacts in many areas of the State. Consequently, increasing program emphasis and resources are being committed to nonpoint source pollution control.

Much has been accomplished in pollution abatement in the State, and there is a continuing trend of water quality improvement. However, a number of significant problems remain, as well as a need for resources to correct these problems.

In areas with heavy industrial and population concentration, sewage and industrial wastes are the major pollution sources. Storm water runoff and combined sewer discharges add to the pollution problems. In western and parts of central Pennsylvania, drainage from bituminous coal mines (primarily abandoned mines) creates serious water quality problems. The same situation exists in the anthracite area of northeastern Pennsylvania. Approximately 2,000 miles of major streams in Pennsylvania are either acidic (low pH) or iron stained by drainage from abandoned coal mines.

Other pollution sources in Pennsylvania include oil and gas well operations in northwestern Pennsylvania, and construction and other earthmoving operations which have created serious erosion and sedimentation problems. A significant number of power plants scattered throughout the State discharge heated water, also a potential pollutant.

The success of Pennsylvania's water quality management program can best be measured by the improvement in quality of previously polluted or degraded water and by the degree to which good quality waters are protected. In 1980, there was a net degradation of 92 miles of streams. This was mainly due to the degradation of 69 miles of the North Branch of the Susquehanna River due to the discharge of oil and organic substances which had been disposed of in the Butler Mine Drainage Tunnel. In 1981, a net improvement of 136 miles of streams was recorded. Major reasons for improvement were improved sewage and industrial waste treatment and a cleanup of 64 miles of the North Branch Susquehanna River which had been reported as degraded in 1980 due to the Butler Tunnel discharge.

A tabulation of stream quality changes (improvements and degradation for the years 1977 through 1981) is summarized in Table 1 (below) by major drainage basin.

Table 1 Pennsylvania Stream Quality (1977-1981)

Drainage Basin	Miles of Streams Improved	Miles of Streams Degraded
Delaware	84	19
Susquehanna	280	152
Ohio	223	281
Lake Erie	3	3
Potomac	1	5
TOTAL	591	410

Summarized in Table 2 below is a status report by drainage basin on compliance with water quality standards. Overall, approximately 79 percent of the State's major streams comply with water quality standards.

Table 2 Compliance with Water Quality Standards

Drainage Basin	Miles of Major Streams	Percent of Major Stream Miles Meeting Standards
Delaware	2,019	75
Susquehanna	6,269	81
Ohio	4,151	76
Lake Erie	105	94
Potomac	418	99
TOTAL	12,962	79

At the present time, 2,744 miles, or approximately 21% of major stream miles in Pennsylvania, fail to meet water quality standards. Abandoned mine drainage, either by itself or in combination with other pollution sources, is responsible for approximately 2,000 of the total miles polluted. Water quality projections to 1983 indicate that 2,406 miles of major streams will fail to meet established "fishable-swimmable" goals. Drainage from abandoned mines, either by itself or in combination with other pollution sources, will account for over 85 percent of the stream miles which are not expected to meet these goals. In addition, the projected lack of federal funds for future municipal treatment projects will hamper clean-up programs.

However, it is apparent from the continuing trend of water quality improvement that progress in attaining the 1983 "fishable-swimmable" goals as set forth in the Clean Water Act is being realized. Improved industrial waste treatment facilities and construction and upgrading of municipal facilities continue to result in improved water quality conditions.

Puerto Rico

For complete copies of the Puerto Rico 305(b) Report, contact:

Environmental Quality Board
1550 Ponce de Leon Avenue
Santurce, PR 00910

Summary

Puerto Rico's worst water quality problem is high fecal coliform counts in a majority of its waters. This problem is caused primarily by overloaded waste treatment facilities combined with poor operation and maintenance of collection, treatment, and disposal facilities. Other contributing factors include lack of adequate wastewater treatment and disposal facilities in many rural communities and for a number of livestock enterprises; industrial noncompliance with NPDES permits; and many illegal dischargers.

Solid waste facilities located near river banks are another problem affecting Puerto Rico's waters. New approaches, coordinated to include the government, industry, and the public, are needed for the management of hazardous and non-hazardous wastes.

A lake study completed under Section 314 of the Clean Water Act showed that of 22 lakes sampled, 18 were eutrophic and 4 were mesotrophic. Restoration of the most important lakes is in doubt due to cuts in the Clean Lakes Program.

In September-October 1981, an islandwide ground water survey was conducted of 57 wells. Major problems found were high salinity in coastal aquifers, the presence of bacteria in water from springs and wells, and contamination by trace organic compounds at selected wells. Main sources for high chloride concentrations seem to be seawater intrusion, concentration of salts from irrigation practices, and residual salts contained in various rock formations.

Rhode Island

For complete copies of the Rhode Island 305(b) Report, contact:

Division of Water Resources
Department of Environmental Management
75 Davis Street
Providence, RI 02908

Summary

This report seeks to summarize existing water quality; current uses of State waters; the difference between current uses and designated uses; and the program costs or other impediments associated with meeting the designated uses. In the discussion of water quality, the basin approach is taken, incorporating basins established for the 303(e) continuing planning process.

As reported in the 1980 305(b) report, significant improvements to water quality have occurred along the Blackstone River with completion of treatment plant projects in Massachusetts and Rhode Island. Within the next few years, depending upon the availability of federal construction grants, significant improvements in water quality will occur along the Pawtuxet River with the upgrading of the Cranston, Warwick, and West Warwick wastewater treatment facilities.

As in other States, the problem of hazardous waste disposal is a major issue in Rhode Island. The Department of Environmental Management and the Department of Health have been working together closely on this problem to prevent environmental damage and insure the continuation of safe surface and ground water supplies.

Existing Conditions

Existing water quality in Rhode Island is summarized by basin in the table below. This information differs from that presented in the past. The major change is that the concept of use attainability is beginning to come into play. Where formerly stream segments were categorized into broad classifications, emphasis is now shifting to site-specific analysis of uses within classifications. Some uses formerly associated with a classification may be deleted for a particular segment.

Rhode Island Water Quality Summary

River Basins/ Estuarine Areas	Total Miles	Miles Meeting Class B	Miles with Impairment of Desig. use	WQ Problems Causing Use Impairment	PS Cause of WQ Problems	NPS Caused WQ Problems
Blackstone R.	88.8	47.9	12.9	2,3	Mu,In	minor
Moosup R.	25.2	25.2	0	-	-	-
Moshassuck R.	17.4	8.2	2	2,3	Mu	major
Pawcatuck R.	115.0	93.9	22.3	3	Mu,In	unknown
Pawtuxet R.	59.7	28.3	17.0	1,2,3	Mu,In	minor
Woonasquatucket R.	22.6	14.3	0	2,3	Mu	major
Total River Miles	328.7	217.8	52.9	-	-	-
Estuarine Areas/Salt Ponds (acres)	117,000	106,000	17,050	3	Mu,In	major

WQ Problems:
1. Harmful substances 2. Oxygen depletion 3. High coliform levels
PS Causes:
MU = municipal sources IN = industrial sources

For example, bathing uses normally associated with Class B waters are impaired in certain areas due to coliform levels. The source of coliforms may be point sources, nonpoint sources, background levels associated with wildlife, or any combination of the three. For these segments, bathing use is impaired, but the general water quality may be well within Class B criteria for other parameters. Moreover, there may be other factors impairing bathing use that were not considered in the classification (channel depths, substrate, velocities, etc.). The Pawcatuck River is by and large the cleanest of the larger rivers in Rhode Island, but has the greatest number of miles with an impairment of a designated use. That use is bathing, and it is impaired by high coliform levels as well as by physical factors. In contrast, the grossly polluted Pawtuxet River has fewer miles with impairment of designated use, but the water quality goals for the Pawtuxet River are lower. Impaired uses of the Pawtuxet River include protection of aquatic life and prevention of nuisance conditions.

South Carolina

For complete copies of the South Carolina 305(b) Report, contact:

South Carolina Department of Health and Environmental Control
Office of Environmental Quality Control
J. Marion Sims Building
2600 Bull Street
Columbia, S.C. 29201

Summary

Of the 88 waters examined with the water quality index (WQI) in this report, six showed 100 percent good quality, 16 showed a mixture of good and fair quality, 56 showed 100 percent fair quality, one showed a mixture of fair and poor quality, eight showed 100 percent poor quality, and one had insufficent data in Water Year 1981. It should be noted that 62 percent of the State's waters are classified either Class B or Class SC and therefore are not aimed at meeting the swimmable part of the fishable-swimmable 1983 federal goal.

Overall trends for Water Years 1979, 1980, and 1981 using the WQI showed three waters improving in quality, 58 showing no trends in quality, 18 showing a lowering in water quality, and nine with insufficient data to detect a trend. For the majority of the waters (65 percent), the quality appears to be changing little even with increased point source loads to some of these areas.

During the past decade, over 390 million dollars in federal funds were spent in South Carolina for the planning and construction of municipal wastewater treatment facilities. It is anticipated that an additional 27 million dollars will be spent in fiscal year 1982. A sufficient water quality data base for assesment purposes was found for 12 out of the 24 construction grant projects. Of these, eight had significant beneficial water quality changes associated with them. The water quality parameter exhibiting the greatest improvement was fecal coliform bacteria, followed by biochemical oxygen demand and dissolved oxygen.

The Clean Lakes Program was established to identify and classify publicly owned freshwater lakes according to trophic condition and to choose methods to restore lakes where use impairment was found. Forty lakes (16 major lakes and 24 minor lakes) were ranked according to their priority for restoration. Federal funding for Clean Lakes projects has been discontinued and there are no federal monies available for lake restoration efforts. The top five priority major lakes were Lake Greenwood, Lake Moultrie, Lake Marion, Lake Murray, and Lake Hartwell. The top five priority minor lakes were Goose Creek Reservoir, Broadway Lake, Lake Edgar A. Brown, Lake Edwin Johnson, and Lake Warren.

In August 1976, the South Carolina Department of Health and Environmental Control and EPA jointly released an advisory against eating fish from Lake Hartwell and Twelve Mile Creek in Pickens County because of high levels of polychlorinated biphenyls (PCBs). The primary source of PCBs was found to be an electrical capacitor manufacturer near Pickens, South Carolina. The source of the PCB problem has been eliminated. Subsequent analysis showed that the advisory could be lifted in certain portions of the lake; it is now only in effect in the areas above S.C. Highway #24. Since 1976, PCB levels in fish have steadily declined. It is now believed the levels will fall below the tolerance limit sooner than peviously expected.

It is recommended that: EPA continue to fund municipal waste treatment projects which will result in significant improvements in water quality problem areas; EPA expedite the pending BAT/Toxic and BAT/BCT guidelines so planning for needed treatment facilities and permitting of discharges under those categories can proceed; funding to implement the EPA proposed water quality standards regulations be increased; and funding be increased through the 106 program to better support special studies and trend monitoring activities.

South Dakota

For complete copies of the South Dakota 305(b) Report, contact:

South Dakota Department of Water and Natural Resources
Joe Foss Building
Pierre, SD 57501

Summary

Nonpoint source pollution is considered the number one quality problem in South Dakota. The Department of Water and Natural Resources (DWNR) has developed an extensive nonpoint source pollution control program using EPA 208 and 314 funds. Nonpoint source pollution has been attacked on several fronts. At the Statewide level, a nonpoint source pollution priority list has been developed county by county. This priority list is based primarily on the personal knowledge of local individuals and needs further documentation of the extent, nature, and impact of the problems. Various State and national agencies and local conservation districts have worked together to develop an effective nonpoint source pollution control program which includes public and local governmental information dissemination; planning and implementation of nonpoint source pollution control projects for specific problem watersheds; development of soil erosion and sediment control ordinances at the Conservation District level; and an effective tracking program. At present, ten problem watersheds are in the implementation process and four are in the planning stage.

Significant improvements in water quality have been achieved through the construction of new wastewater management facilities. However, many needs must still be addresed. The FY 1980 EPA Needs Survey indicated that the following categories must still be resolved: municipal discharges causing water quality problems; municipal discharges that are causing public health hazards; and municipal discharges that do not meet minimum federal requirements.

The degree of impairment of beneficial uses of South Dakota's streams and rivers due to water pollution ranges from none to severe. The most severe impairment is occurring in the Whitewood Creek/Belle Fourche River/Cheyenne River drainage. The sources of the pollution are mine tailings from more than 100 years of mining activities, current mine discharges, nutrients from municipal wastewater discharges, urban runoff, agricultural runoff, livestock, and wood preservation plants. Severe impairment is also occurring in the lower reaches of the White River, in the Bad River, and in Rapid Creek from Rapid City to the Cheyenne River. The problems in the White River are related primarily to erosion of the Badlands and livestock watering. Lack of flow, livestock watering, and soil erosion are the primary causes of water quality degradation in the Bad River. Lower Rapid Creek is degraded by urban runoff and effluent from the municipal wastewater treatment plant. Landowners along this reach report that livestock and wildlife will not drink the water and that the water causes skin irritation. These problems have not been documented or a possible source determined.

In 1981, DWNR examined lake water quality and produced a priority ranking for lake restoration in South Dakota. One hundred lakes were ranked so that restoration monies would be spent on the projects which would produce the most lake improvement and benefit the most people. Most South Dakota lakes are severely affected by runoff which carries silt and nutrients.

Ground water accounts for 45% of all water use in South Dakota. Usage would be higher but is limited by water quality. Many of the deeper aquifers are unfit for domestic use or irrigation because of high concentrations of dissolved salts. Many of the shallower aquifers are polluted with high concentrations of nitrates. Nitrate contamination is of particular concern in Brookings, Hamlin, and Gregory counties. The two largest sources of ground water pollution in South Dakota are excessive and improper use of agricultural chemicals, especially nitrogen fertilizers, and the leakage of poor quality water from deep aquifers into higher quality shallow aquifers from improperly built and abandoned artesian wells.

In terms of nationwide standards, the water quality of South Dakota's public drinking water supplies is poor. Ground water comprises all or part of the supply for 95% of these facilities. Many of these supplies do not meet the recommended criteria for dissolved solids (70%), chloride (6%), sulfate (53%), iron (37%), manganese (51%), fluoride (8%), nitrate (3%), sodium (80%), and selenium (2%). Trihalomethanes and radiological parameters are also present in some supplies, but the extent of the problem is not known.

Tennessee

For complete copies of the Tennessee 305(b) Report, contact:

Tennessee Department of Public Health
Division of Water Quality Control
621 Cordell Hull Building
Nashville, TN 37219

Summary

An overview of water pollution problems in Tennessee indicates that, in general, the quality of waters in the State is very good. There are no gross pollution problems encompassing lengthy segments of streams; most of the pollution is confined to short segments of streams and is the result of one or two point source discharges. Those areas which suffer pollution from multiple dischargers are mainly the larger metropolitan areas of Chattanooga, the Upper Holston River in the Kingsport area, and to a lesser extent the areas associated with Memphis, Nashville, and Knoxville.

There is a considerable amount of surface mining activity in Tennessee, some of which has a very detrimental affect on water quality. Most problem areas are located in the Upper Cumberland River Basin, the Clinch River Basin, and the Lower Tennessee River Basin, and are largely the result of surface mining for coal in highly acidic geologic strata mountainous areas. Because of the Nation's current energy problems, an increase in strip mining for coal is likely, with an equal increase in water quality problems and environmental degradation. Stronger laws and an expanded enforcement program in this area will be necessary to improve this situation and to prevent further degradation. Another area in the energy field needing increased and careful scrutiny is that of nuclear power plants. Thermal discharges and accidental losses of radioactive materials may threaten water quality and public health.

Eutrophication, though not excessive, is beginning to be a problem at some specific sites across the State. Out of 112 publicly owned lakes in Tennessee, 54 have been designated as having problems with eutrophication.

Evaluation of sampling data from 1980 and 1981 generally shows that there has been little change in water quality in Tennessee. Some parameters, especially suspended solids, pH, iron, and manganese, are in consistent violation of State standards in a few river basins. Many of the watersheds in which violations are found are also where surface mining occurs. However, these problems are not as widespread as that of fecal coliform bacteria. Other parameters showing occasional violations include mercury, lead, copper, and phosphorus. These violations are infrequent and occur in various locations across the State, with no specific trends evident. Parameters which show few, if any, violations are BOD_5, dissolved oxygen, temperature, nitrogen (as nitrates and nitrites) and chromium. There are very little data on organic chemicals, but the need for this data is becoming apparent.

Nonpoint source runoff is the major source of agricultural chemicals appearing in streams in the intensive agricultural areas of Western Tennessee. Because of the erosion of up to one inch of soil per year in areas of Western Tennessee, chlordane, DDT, DDE, and other agricultural chemicals are leached from or are carried with the eroding soil to the State's streams.

Industrial pollution problems have begun to be reduced in recent years due to the National Pollutant Discharge Elimination System delegation from EPA giving the State the authority to permit and require compliance monitoring of industries throughout the State. However, there are still significant problem areas in segments of rivers and streams due to past and present industrial discharges which cannot be ignored, such as the Holston River in Upper East Tennesee, the Wolf River near Memphis, and Chattanooga Creek near Chattanooga.

The State of Texas is divided into 23 inland and coastal basins for water quality management and planning purposes. The basins are further divided into 311 stream and coastal segments, comprising 16,115 stream miles. Of the 311 segments, the Department has determined that 242 segments presently comply with all applicable stream standards, or are projected to be compliant following incorporation of best practicable treatment by industry and secondary treatment by municipalities. The remaining 69 segments either do not presently comply with applicable stream standards or will be noncompliant with the imposition of best practicable and secondary treatment facilities. Some of these 69 segments may be in compliance with stream standards, or are projected to be brought into compliance as a result of incorporation of advanced waste treatment/advanced secondary treatment for municipalities or best conventional treatment for industries.

The following table summarizes Texas water quality by stream mile for the past five years.

Statewide Summary of Water Quality	1977	1978	1979	1980	1981
Total stream miles	15,565	15,565	16,107	16,107	16,115
Stream miles that are fishable/ swimmable	11,706	13,649	14,598	14,598	14,606
Additional stream miles expected to be fishable/ swimmable by 1983	866	682	992	992	992
Stream miles not expected to be fishable/ swimmable*	2,992	1,234	458	458	458

*Excludes waterway miles not intended to become fishable/swimmable by 1983

Texas

For complete copies of the Texas 305(b) Report, contact:

Texas Department of Water Resources
Post Office Box 13087
Austin, TX 78711

Summary

Texas rivers, streams, and lakes are subjected to enormous pressures from industrial, agricultural, and recreational endeavors, as well as from steadily increasing population. The State's population is expected to increase by over 5 million by the year 2000. Even with this growth and increasing water use, the quality of the State's waters has improved significantly. Much of this improvement is directly related to improved wastewater treatment programs by both municipalities and industries. These improvements have been accompanied by significant economic growth activities that are water resource dependent, demonstrating that high levels of water quality and economic activity can and are occurring simultaneously in Texas.

Expanded development of the State's water resources and pressures to satisfy numerous beneficial purposes have created local, regional, and Statewide problems of varying intensity. While surface water quality continues to be a major concern, ground water overdraft and degradation are particularly troublesome because of expanding economic activities that are ground water dependent.

Ground water comprises approximately 70% of the total water used by Texans for domestic, municipal, industrial, and agricultural purposes. A ground water quality monitoring network consisting of some 5,600 observation wells is currently maintained by the Department, with 1,100 wells being sampled annually for the common constituents of natural ground water. Local, regional, and other State and federal agencies are also involved in additional monitoring of the quantity and quality of Texas' ground water resources.

Trust Territory of the Pacific Islands

For complete copies of the Trust Territories of the Pacific Islands 305(b) Report, contact:

Trust Territory Environmental Protection Board
Saipan, Mariana Islands 96950

Summary

The Trust Territory of the Pacific Islands (Micronesia) has a total of 13 identified segments, four of which are fresh surface waters. The quality of water in these segments has either improved, due to the elimination of a number of point and nonpoint sources, or remains in its previous condition.

Urbanization, rapid population growth, substandard housing, incomplete sewer and solid waste disposal systems, nonpoint pollution sources, and a lack of adequate safe drinking water are still serious environmental pollution problems in Micronesia.

Water pollution from municipal sources results in water below the level of existing standards in most of the governmental centers in Micronesia and remains a major public health problem. Micronesia recognizes this problem and is continuing to construct sewer treatment facilities, collection systems, and house connections in all major segments.

Rainfall runoff, poor land management practices, and the prevalence of pit and over-water latrines in urban and rural areas contribute substantially to the largely undefined nonpoint source problem. The implementation and general acceptance of earthmoving permit regulations has tended to reduce this problem from construction causes.

Erosion nevertheless threatens the water quality, ecology, subsistence fishing, and overall productivity of the many lagoons and reefs fringing Micronesia's high population centers.

Although there are numerous observed violations of Trust Territory Water Quality Standards, particularly for bacterial standards, most of these areas can be brought within standards by application of appropriate sewage treatment technology and the necessary sewage collection systems.

There are limited areas adjacent to governmental centers which presently do not support shellfish, fish, and wildlife populations appropriate to the waters. These areas have been subjected to nonpoint source pollution, primarily siltation, resulting from poor construction practices. Recent regulations promulgated by the Trust Territory Environmental Protection Board are bringing some degree of control over these sources. In most instances, natural habitat restoration and recolonization will restore damaged areas to near original productivity and ecological balance.

Utah

For complete copies of the Utah 305(b) Report, contact:

Utah Department of Health
Division of Environmental Health
Bureau of Water Pollution Control
150 West North Temple
P.O. Box 2500
Salt Lake City, UT 84110

Summary

Because Utah is the second driest State in the Nation, it has faced and continues to face unique problems in pollution control. Most streams in Utah have relatively low natural streamflow. These flows are often further reduced by diversions for irrigation, domestic, and industrial uses, and thus can be significantly affected by pollution discharges. Population growth and industrial expansion are placing increasing pressures on water quality/public health protection technology. Water pollution controls must become more efficient because there is increasingly more pollution to control and because the environment's ability to absorb pollution does not increase. New kinds of pollution such as hazardous chemicals, and imminent water quality problems from industrial development and mining of coal, oil shale, tar sand, and uranium, must also be dealt with. However, regardless of the type of pollution, it is obviously less expensive to prevent problems than to pay for their solution after they occur.

The Utah Water Pollution Control Committee (UWPCC) has grouped the waters of the State into classes to protect their beneficial uses and has established numerical standards of water quality parameters for each of these uses. In order to monitor for attainment of these standards, the Bureau of Water Pollution Control has established over 500 active and semi-active stream sampling stations. Of these, 170 have been selected for trend analysis to determine water quality degradation or improvement. This report discusses the findings from those 170 stations.

Point sources present a geographically limited problem and are obviously more significant in highly populated areas. Wastewater treatment facilities concentrated in certain drainages seriously affect receiving streams because of the population loads. The important example is the Jordan River, which flows from south to north through the Salt Lake Valley. Eight municipal treatment facilities are currently in operation treating wastewater from a population of 700,000 and discharging into the Jordan River.

Most remaining water quality problems in Utah result from nonpoint sources rather than point source discharges. Nonpoint sources of pollutants include runoff from natural geologic formations, agriculture, urban areas, hydrologic modification, mining, recreation, construction, and silviculture. Natural sandstone formations in eastern and southern Utah contribute significant amounts of sediments through erosion. Natural deposits of salts, phosphates, fluorides, nitrates, and arsenic also contribute to decreasing water quality in certain areas of the State.

The majority of the total water use in Utah is for agriculture. As a result, this is one of the primary sources of man-induced nonpoint pollution. Diversion of waters for irrigation tends to concentrate salts and solids in stream channels. Also, return flow discharges add salts, nutrients, and sediments from croplands into stream channels. Overland runoff contributes salts and sediments from non-irrigated croplands and coliform bacteria from pasture land.

Utah and EPA designated 23 stream segments in Utah as critical water quality problem areas in fiscal year 1981. Improved data analysis has allowed an updating of that priority list in the 305(b) report. The findings of the two reports complement one another; however, this 305(b) report represents a continuing update of the priority stream segments. The Weber River and its tributaries from the Stoddard diversion to its headwaters is the most impaired stream for its designated uses. Recreational developments, agriculture, and energy exploration in the headwaters of this stream segment are the primary reasons why it is the most impaired. Other segments that remain high on the list (Provo River, Jordan River, Spanish Fork River) are those which are most affected by high population. Nonpoint agricultural sources and salinity problems are the reasons why the other stream segments are on the priority list.

Salinity will remain a problem in Utah because of contributions of dissolved solids from natural runoff and agriculture. The State will continue to pursue salinity control activities in the Colorado River and Sevier River basins.

Vermont

For complete copies of the Vermont 305(b) Report, contact:

Vermont Agency of Environmental Conservation
Department of Water Resources
State Office Building
Montpelier, VT 05602

Summary

Vermont has continued to take positive steps toward achieving the desirable goal of total fishable/swimmable waters. The State has for all practical purposes attained total fishable waters. Also, all waters in the State having a designated water use compatible with swimming are capable of achieving this goal. Obviously, the swimmable goal requires a qualifier of "when and where attainable." The level of coliform bacteriological organisms in flowing waters has continued as a basic water quality problem. Nonpoint runoff originating from agricultural, silvicultural, and urban areas (stormwater and combined sewer overflows) is believed to be essentially responsible for the elevated bacteriological levels. These sources are not currently economically controllable.

Eighty-four percent of Vermont's segmented river miles are presently in compliance with all applicable water quality standards. Waters have been brought into compliance mainly through the upgrading and new construction of municipal wastewater treatment facilities.

Substantial progress has been made by the State in cataloging industrial discharges and their impact on receiving water quality and on municipal treatment facilities (in the case of pretreatment industries). The majority of industrial discharges in Vermont presently employ Best Practicable Treatment Technology.

The water quality of Vermont's streams and lakes has continued to show notable improvement during the past two years. This progress is due primarily to continued wastewater treatment facility upgrading and construction, and to further implementation of identified best management practices for construction, silviculture, and agriculture. Implementation of these best management practices has been to a large degree voluntary. These voluntary efforts have been commendable, but continued implementation will be necessary for further water quality progress.

It is fully recognized that serious potential problems still remain and must be addressed if Vermont's high water quality is to be maintained for future generations. The majority of these problem areas such as hydropower development, acid precipitation, protection of upland streams, and water withdrawals do not have straightforward solutions and will require new and innovative approaches to water quality management. In the face of increasingly limited financial resources, implementation of viable solutions to these complex problems will also be more difficult. Vermont is determined to meet this challenge and to protect and maintain its high quality waters.

Virgin Islands

For complete copies of the 305(b) Report for the Virgin Islands, contact:

Division of Natural Resources Management
Department of Conservation & Cultural Affairs
Charlotte Amalie, St. Thomas VI 00801

Summary

The Virgin Islands are made up of three islands—St. Thomas, St. John, and St. Croix—and approximately 50 smaller uninhabited islands. Monitoring data collected over the years have documented the major water pollution problems in the Territory and the progress toward meeting the goals of the Clean Water Act, as follows:

St. Thomas

- New desalination units on St. Thomas prevent the infiltration and contamination problems which plagued the island's public drinking water supplies before 1981.
- Continuous violations of the territorial and federal drinking water standards for bacteria and turbidity have occurred in the drinking water supplied by the Housing Authority. Plans are underway to install new water treatment systems, although funds are not yet available.
- Significant improvements have been made in the operation of three sewage treatment plants (STPs) in the Turpentine Run watershed during 1980-82. These STPs had been discharging partially treated sewage into aquifer recharge areas.
- All open bays have retained their natural water quality conditions.
- As a result of the completion of the Charlotte Amalie STP, the water quality of the Charlotte Amalie harbor has improved since the early 1970s.
- The major water quality problem on St. Thomas is the steady decline in water quality within the mangrove lagoon. Reasons for this decline are the discharge of partially treated sewage by various STPs, and the elimination of large portions of the mangrove forests because of fill operations and channelization.

St. John

- The ground water resources of this island are considered adequate to serve public needs.
- Stormwater runoff causes some standards violations in Cruz Bay.

St. Croix

- New desalination units were installed on St. Croix in 1981. Past problems with infiltration and contamination have therefore been solved.
- Potential ground water contamination problems exist due to leaks in sewage interceptors. Hydrological investigations are underway.
- Water quality in the Christiansted Harbor has improved with the completion of the St. Croix STP.
- The greatest improvement in water quality has occurred along the island's south shore.
- The water quality of the Altoona lagoon and the Salt River estuary is degraded by sedimentation and stormwater runoff.

Program Needs

The current National Pollutant Discharge Elimination System sets the same effluent criteria regardless of the nature of the receiving waters. The practical and cost-effective approach is to devise different criteria for the oceans, estuaries, and inland waters in tropical U.S. environments.

Virginia

For complete copies of the Virginia 305(b) Report, contact:

Virginia State Water Control Board
P.O. Box 11143
Richmond, VA 23230

Summary

Virginia has nine major river basins with over 27,000 miles of perennial streams and 500 square miles of coastal wetlands and embayments. Water quality is generally excellent except in a relatively few areas of the State, reflecting progress made since the inception of the Virginia Water Control Board in 1946. As a result of its NPDES permit program controlling discharges to the State's waters, Virginia has achieved a reduction in BOD_5 of about 54 percent since 1976, despite a growth in population of about seven percent.

Water Quality Standards Compliance

Virginia has 314 water monitoring stations which are sampled monthly for major water quality parameters. Compliance with water quality standards is discussed for four primary parameters: dissolved oxygen, pH, temperature, and fecal coliform bacteria. Trend data for these constituents are also discussed.

During the reporting period, only 14 percent of monitoring stations had even one monthly sample below the minimum dissolved oxygen standard. The dissolved oxygen level at 76 percent of stations was stable over the last 5-10 years. Stations showing an improving trend outnumbered stations with declining oxygen levels almost two to one.

About half of the stations had at least one pH sample outside the range allowed by the standard. Most pH standard violations were due to natural conditions; only three stations had pH problems directly attributable to pollution. Trend analyses show that pH levels are stable at most stations, but stations with increasing pH outnumbered stations with decreasing pH by about three to one.

Only seven percent of the stations had even one value above the allowable temperature maximum. All temperature standard violations were thought to be natural; none were attributed to point sources.

Fecal coliform bacteria levels exceeded allowable levels at 71 percent of the stations. Counts remained stable at 75 percent of the stations, but stations showing improvement outnumbered stations showing increasing counts by about three to one.

Toxic Pollutant Problem Areas

The Virginia report highlights three areas where toxic pollutants are a problem:

- Seasonal commercial fishing restrictions are in effect for 113 miles of the James River estuary because of contamination by the pesticide Kepone. Sport fishing is allowed.
- On the North Fork Holston River, 81 miles are restricted to catch-and-release fishing due to mercury pollution. Abatement measures are underway.

- A fish consumption Health Advisory is in effect for 102 miles of the South River and the South Fork Shenandoah River due to mercury pollution.

The Virginia State Water Control Board completed an EPA-funded study of 161 lakes in March 1981. The lakes were ranked according to trophic status, size, population served, and other factors.

Virginia has been working jointly with EPA, Maryland, Pennsylvania, and citizen groups over the last five years to administer and direct the Chesapeake Bay Program, a $27 million effort to determine environmental problems in the Bay and recommend strategies to assure its protection. Comprehensive planning and coordination are essential to ensure that development and environmental controls are properly balanced. Proper planning is vital if the Bay is to remain a viable resource to be both enjoyed and utilized by future generations of Virginians.

Washington

For complete copies of the Washington 305(b) Report, contact:

Washington Department of Ecology
Office of Water Programs
Water Quality Management Division
Mail Stop PV-11
Olympia, WA 98504

Summary

This document presents Washington's water quality goal, problems, priorities, problem correction/prevention strategies, and planned water quality management activities for the coming year and beyond.

A tabulation of the number of river and marine water segments by water quality status is presented below.

Number of River and Marine Water Segments by Water Quality Status

	Northwest	Southwest	Central	Eastern	Total State
Meets Goal	21	34	8	2	65
Insufficient Data	12	21	1	5	39
Will Meet Goal	1	0	0	0	1
Point Source Problems	2	5	0	1	8
Nonpoint Source Problems	11	10	5	4	30
Will Not Meet Goal	5	9	2	11	27
Total	52	79	16	23	170

Five rivers and marine segments have been identified as high priority waters experiencing water quality problems. These are: the Duwamish Waterway and River to the limit of tidal influence; Commencement Bay, including the main and inner bay to the Puyallup River; the inner and outer areas of Grays Harbor; the Yakima River from its mouth to its headwaters; and the Spokane River from its mouth to the Washington/Idaho border. Swimming and fishing uses are among those uses impaired in these waters.

Washington has a long history of effectively regulating point sources of pollution, especially municipal and industrial discharges. The principal vehicle for such regulation has been the waste discharge permit program. Certain financial incentives also have been provided to encourage compliance with permit requirements.

As point source problems have been corrected, more attention has been shifted to nonpoint source problems. A subjective evaluation of the relative significance of the nonpoint source problems resulted in the following priorities:

- Agriculture
  - Irrigated Agriculture
  - Dryland Agriculture
  - Dairy Waste Management
- Silviculture
- On-Site Waste Disposal
- Urban Runoff

Priorities also have been identified for the control of point sources. Priorities for regulating municipal and industrial discharges have been identified through the waste discharge permit and compliance programs. Priorities also have been identified for the cleanup of municipal discharges through the municipal wastewater facilities construction grants program.

West Virginia

For complete copies of the West Virginia 305(b) Report, contact:

West Virginia Department of Natural Resources
Division of Water Resources
1201 Greenbrier St.
Charleston, WV 25300

Summary

This assessment of the water quality of West Virginia streams is derived from information collected between July 1979 and June 1981. It is based upon data obtained from monitoring stations maintained by the West Virginia Division of Water Resources and ORSANCO.

Generally, there have been no changes in water quality in West Virginia in recent years. The parameters which were consistently higher than State criteria were coliform bacteria, iron, and phenols. pH, cadmium, and manganese were continual problems on specific streams but were not as ubiquitous as bacteria and phenols. Heavy metal violations were scattered throughout the State and the report period. Parameters which have remained consistently within State criteria include dissolved oxygen, temperature, and mercury.

High phenolic levels have occurred in the Upper Ohio River during the report period. The water quality standard has often been exceeded. High concentrations have resulted in treatment problems at the Wheeling water treatment plant. Possible sources include facilities in Ohio, Pennsylvania, and West Virginia whose total NPDES permit limitations exceed the river's dilution capability at 7-day, 10-year low flow. Severe problems have resulted from periodic slugs of unknown origin, possibly contaminated ground water, runoff from point and nonpoint sources, spills, dumping, or municipal discharges. Extensive monitoring efforts involving EPA, Ohio, Pennsylvania, West Virginia, and the City of Wheeling have failed to identify a single major source for the problem. It now appears the excessive concentrations are the cumulative result of a number of separate contributions including ground water, active industrial facilities, publicly owned sewage treatment works, and others.

This problem's diverse source and interstate nature make it difficult to address. Some federal oversight is needed to ensure that all involved States initiate corrective measures. The major contributing industrial permits in West Virginia are due for reissuance soon and more stringent effluent restrictions on phenolic discharges may be necessary. An areawide effort has been directed towards better "housekeeping" at plant sites thought to be contributing phenolic materials to the river or ground water. Several more years of effort by the involved States will be necessary to develop, initiate, and obtain significant results from an areawide management effort.

Acid mine drainage from abandoned sources continues to be a severe problem in certain areas of the State. The Divisions of Water Resources and Reclamation are currently working to produce an inventory of these sources and to estimate their acid production. Funds have been established by the Surface Mining Control and Reclamation Act of 1977 to reclaim abandoned mine sites. While water quality improvement is not the highest priority under the Act, it is hoped that these funds can eventually be used for this purpose. The Division of Water Resources has recommended that the Big Sandy Creek drainage in Preston County be considered for reclamation when funds are available.

Wisconsin

For complete copies of the Wisconsin 305(b) Report, contact:

Wisconsin Department of Natural Resources
Box 7921
Madison, WI 53707

Summary

The State of Wisconsin contains almost 15,000 lakes and tens of thousands of river and stream miles. There are three major river systems: the Wisconsin, the Fox, and portions of the Mississippi River. Portions of Lakes Superior and Michigan also fall within Wisconsin's boundaries. These varied resources are abundant, but human use has degraded their quality. The Federal Water Pollution Control Act Amendments of 1972, as amended, and associated State statutes have provided a basis for pollution control programs. Resulting water quality improvements have been substantial.

The monthly monitoring program at 44 sites around the State provides a "snapshot" look at the water quality of rivers over time. The monitoring is not an intensive survey, but documents background water quality and general trends in water quality improvement or degradation. Comparison of 1980-1981 data on concentrations of total phosphorus and suspended solids with 1977-78 data shows an average reduction of one-third. These pollutants typically reflect nonpoint source pollution and indicate declining amounts of polluted runoff. The average concentration of biochemical oxygen demand, which commonly indicates water quality degradation from point sources such as municipalities and industries, has decreased at 75 percent of the sites.

Wisconsin's lakes are degraded by nutrient enrichment or eutrophication. A 1979 classification of a representative sample (1,500) of the lakes showed that over 80 percent have a low to medium degree of eutrophication. Another classification of 3,200 lakes is underway.

Wisconsin's Clean Lakes Program aims to limit degradation of damaged lakes and protect the quality of others. The program has administered almost 25 lake rehabilitation projects around the State. Completed projects have resulted in relatively weed-free open water and greater public use of the lakes.

Wisconsin's ground water is abundant and pure. In the center of the State, however, irrigation practices have resulted in ground water contamination from nitrate fertilizers. Also, the pesticide aldicarb has been detected in 70 of the 383 wells tested in the area. Aldicarb levels considered hazardous by EPA were measured in 20 wells. The State Pesticide Review Board has prohibited aldicarb use in central Wisconsin in 1982.

Water pollution control programs are the basis for water quality improvement in surface waters. These programs carry out Wisconsin's commitment to achieve the 1983 goal of "fishable and swimmable" waters. There were 568 municipal dischargers in 1981. By mid 1982, about 60 percent of these dischargers will be complying with the requirement for them to meet an assigned level of wastewater treatment. By July 1, 1983, a compliance rate over 80 percent is predicted.

Over 125 municipalities have complied with their required level of wastewater treatment by upgrading treatment works under the construction grants program. Prior to 1979, all funding was derived from the federal government. Since 1980, though, the State-established Wisconsin Fund has been the major source of funding. The Fund has granted or allocated over $270 million in the past three years. Federal grants totaled about $65 million during this same time.

Nonpoint source pollution—pollution whose source cannot be traced to a single point—is a serious problem in about half of the State. So far, the pollution control program has centered on critical problem areas in 11 watersheds.

A toxic substances survey of Great Lakes tributaries in Wisconsin showed that excessive amounts of polychlorinated biphenyls (PCBs) occurred in southern Lake Michigan tributaries. Three sources of toxics were identified.

The State phosphate detergent ban expired on June 30, 1982. Attempts have been made to document reductions in phosphorus in surface waters as a result of the ban, enacted in 1979, but the length of the ban was too short to cause a measurable change in river phosphorus levels. The study did show lower levels of phosphorus in wastewater entering municipal treatment plants.

In 1979, precipitation collected in Wisconsin was found to be at least ten times more acid than normal. A research program is being carried out by the State, public utilities, and others to define the potential impact of acid rain.

Wyoming

For complete copies of the Wyoming 305(b) Report, contact:

Wyoming Department of Environmental Quality
Water Quality Division
1111 East Lincolnway
Cheyenne, WY 82002

Summary

The Wyoming Statewide Water Quality Assessment provides a summary of water quality information on significant stream segments, lakes, and ground water aquifers in the State.

Water quality data, inventories, indexes, and assessments indicate a generally high quality of water in the State. For years the State has had a low density population coupled with little industrial development. However, in recent years, a rapidly growing population associated with energy and mineral development has necessitated intensified efforts to protect valuable water resources.

Through a combination of State and federal water quality programs, the Water Quality Division has been able to address and solve a number of water quality problems. Although the solution of existing problems is exceedingly important, the Division will continue to emphasize operation of programs which protect high quality waters from degradation.

This report provides summary information on 40 surface waterbodies which have been designated by the Water Quality Division as priorities. In reviewing the 40 priority segments, it is evident that the problems are diverse, widespread, and in many cases have no simple solution.

In some cases, such as Goose Creek (priority #2) and Clear Creek (priority #16), the problems are caused primarily by point sources which are being addressed through compliance schedules and the construction grants process. However, a number of problems in lakes and stream segments are the result of diffuse nonpoint sources, or combinations of point and nonpoint sources. Additionally, a number of federal agencies may be involved in management of lands in a particular drainage area. In order to address these types of problems, the Division cooperates with other State and federal agencies, and utilizes available resources from a variety of programs to obtain a comprehensive solution.

The ambient ground water quality of the State's aquifers varies tremendously. High concentrations of flouride appear to be the most widespread problem for Wyoming's drinking water aquifers. All basins had some wells showing levels of flouride exceeding primary standards in at least one major aquifer. Selenium is also a fairly widespread problem. It should be emphasized, however, that the problems are local in nature. The source of the selenium and flouride appears to be a natural result of host rock properties and ground water characteristics. Other ground water pollution problems are surfacing throughout the State, resulting primarily from past housekeeping procedures at many industrial facilities.

Overall, however, the State has been fortunate to enjoy generally high quality water resources. Wyoming has not had the severe problems faced by many of the densely populated, heavily industrialized States. It is the goal of the Division to continue to make all efforts to reduce or eliminate current pollution problems where feasible, and to protect high quality waters from degradation.